

The University of Chicago

THE PRIMARY FUNCTIONS OF TOLEDO, OHIO

A DISSERTATION SUBMITTED TO THE FACULTY
OF THE DIVISION OF THE PHYSICAL SCIENCES
IN CANDIDACY FOR THE DEGREE OF DOCTOR
OF PHILOSOPHY

DEPARTMENT OF GEOGRAPHY
MARCH, 1947

By
ALBERT GEORGE BALLERT

CHICAGO, ILLINOIS
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PREFACE

In large measure this study of "The Primary Functions of Toledo, Ohio" emphasizes three groups of pursuits--transportation, commerce, and manufacturing. These three taken together provide the major source of livelihood for Toledo's 300,000 inhabitants. The buildings in which these functions are housed, the facilities by which they are served, and the flow of their activities are conspicuous in the city's pattern and give character to its structure. Because of their high importance, a portrayal of their evolution and present distribution in the metropolitan area, and an interpretation of their distinctive and interrelated activities become the major objectives of this dissertation. In other words the quality and strength of the city's economy is under examination. In some cases the examination is based on both qualitative and quantitative materials. In others it rests on more fragmentary evidence. It is hoped, however, that the sum total will provide materials and understanding which will aid economic and physical planning of the community. In the words of John Stuart Mill, ". . . knowledge insufficient for prediction may be most valuable for guidance."¹

There are few subjects which produce so sharp a difference of opinion as a discussion of a place which happens to be somebody's home town. However, as Toledo is the place of birth and the residence of the author for more than three decades, he feels the city and the region are well a part of him. This provided the initial impulse for the study. Further interest developed when during a study of Urban Geography in Professor Charles C. Colby's seminar at the University of Chicago, it became evident that Toledo presents many distinctive problems and opportunities.

Field work for this dissertation was undertaken during the summer of 1944. Library research and map drafting were carried on during the following year while the author was a member of the

¹John Stuart Mill, A System of Logic (8th ed.; London: Longmans, Green & Co., 1941), Bk. VI, chap. ix, 585.

University of Chicago faculty. Since September, 1945 the writer has been employed as Geographer for the Toledo Chamber of Commerce. This rôle has provided a unique opportunity to investigate many of the innumerable questions, some small in scope but nevertheless significant, which are needed to gain a true perspective of the city. The staff and members of the Chamber have been exceedingly cooperative whenever called upon for assistance. Among the author's colleagues, special thanks are due Mr. Burdette M. Baldwin, Manager of the Industrial Department of the Chamber.

Many individuals and organizations in Toledo have provided the author with valuable information and assistance. Among the organizations, I am particularly grateful to the staffs of the Toledo Public Library, the Toledo and Lucas County Plan Commissions, and the Division of Engineering and Construction of the City of Toledo. The whole-hearted cooperation of commercial and industrial organizations has been most heartening.

Within the walls of Rosenwald Hall are many to whom I am grateful for their aid and interest. Misses Margaret MacGregor and Agnes Whitmarsh of the Earth Science and map libraries were most obliging at all times. Professor Henry M. Leppard gave much constructive criticism, especially on the maps used in this volume. My heaviest debt of gratitude is to Professor Colby, Chairman of the Department of Geography, under whom this dissertation was written. His searching queries and continuing interest have guided and encouraged the author immeasurably.

Finally I wish to thank my wife for the many ways in which she has aided in the preparation of this dissertation and for her continual encouragement.

December 24, 1946

Albert G. Ballert
Toledo, Ohio

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TOLEDO'S POSITION IN THE AMERICAN MANUFACTURING BELT

- BORDER OF MANUFACTURING BELT
- INDUSTRIAL AREAS (U.S. Census)
- CHICAGO MAJOR METROPOLITAN CENTERS
- ALTERNATE HINTERLAND CITIES OVER 100,000
- RAILROADS (Through Routes)
- AIR ROUTES

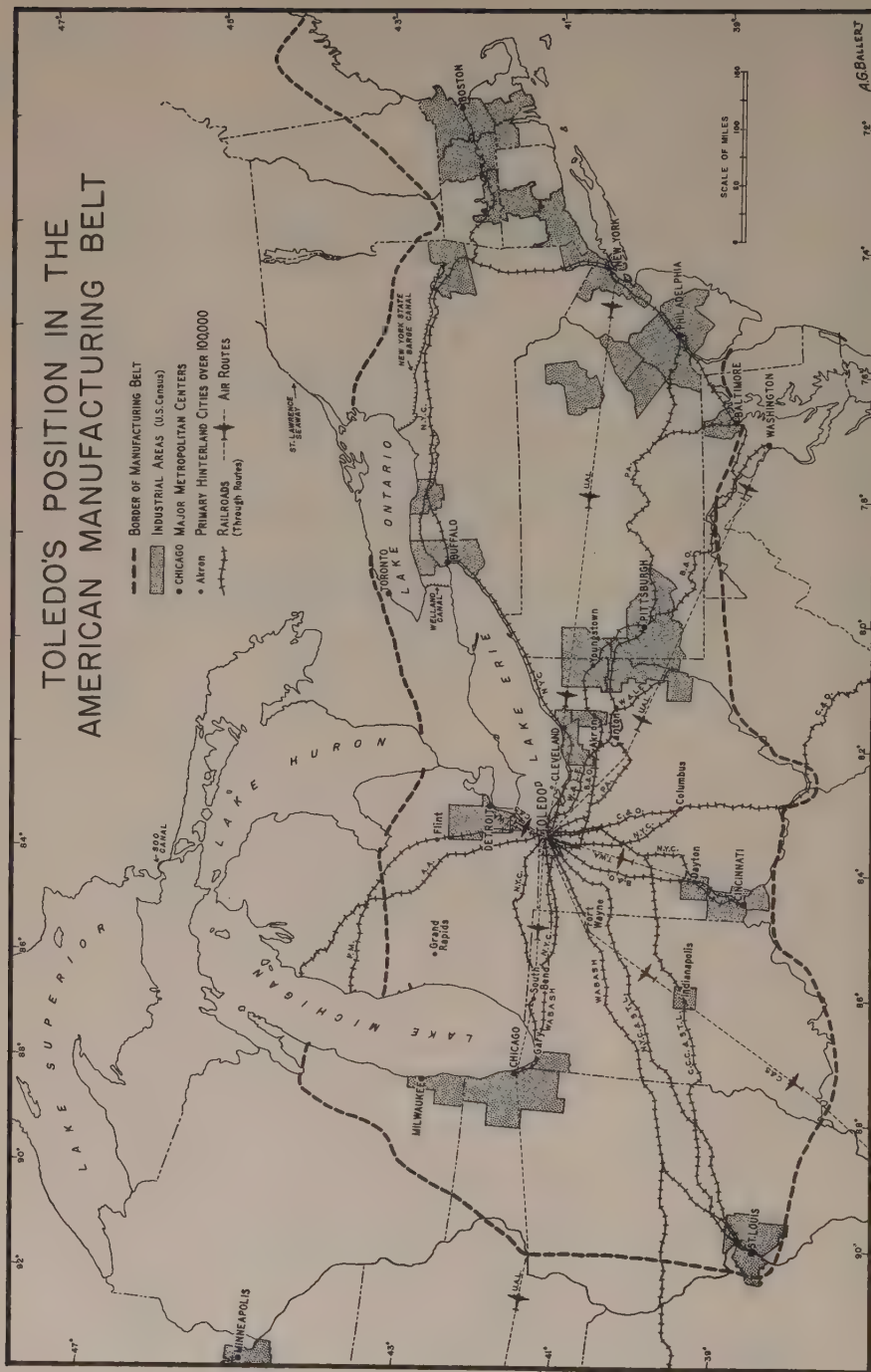


Figure 2

CHAPTER I

THE CITY AND ITS FUNCTIONAL STRUCTURE

Toledo is a transportation center astride the Maumee River at the point where this sluggish stream empties into the shallow head of Lake Erie. In addition to its reputation as a transportation focal point, Toledo is recognized as an important industrial center. The third major activity is that of trade and distribution. These primary functions give a special quality to the city as a whole and to various portions of the community.

The limits of the city enclose an area of 41.62 square miles within which lives a population of approximately 300,000 persons. In general, Toledo has an irregular diamond-shaped outline with the long axis oriented along the northeast flowing river (Fig. 1).¹ Within these political confines, the useable land area (excluding streets and alleys) is approximately 72 per cent in use (see Appendix I).² In its growth, the city has spread out in fairly regular fashion on the almost featureless lacustrine plain on which it is located. Poor drainage, however, has affected land use in a number of places. In fact, in the low marshy lake border area the city has developed but little. As a result, Toledo lies along the river rather than on the border of the lake and thus does not show the crescent-form which is typical of Buffalo, Chicago, Cleveland, and several other cities on the shores of the

¹It is suggested that the reader frequently refer to Figure 1, which is in the pocket at the back of this publication. The map is unattached to facilitate its use.

²From MS records of Toledo and Lucas County Plan Commissions. The land area of the city is 37.45 square miles and the water area is 4.17 square miles. Together, the 8.77 square miles of streets and alleys and the 20.55 square miles of other land in use represent about 78 per cent of the land area or 70 per cent of the total area of the city.

In a survey of 16 self-contained cities, the developed area averaged 60.2 per cent of the total city areas (Harland Bartholomew, Urban Land Use [Cambridge: Harvard University Press, 1932], p. 123).

Great Lakes.

At the north, the political limits reach the Ohio-Michigan boundary in the low-lying lake zone (Fig. 1). Elsewhere on the north, a suburban-rural area about two miles wide with scattered industries separates the two man-made boundaries. At the east, the city is bordered by industry and modest residences. Beyond are the extensive farmlands of the rich Lake Erie plain. Along the narrow southern flank, two suburbs, Maumee and Rossford, border the city and the river. A short distance upstream from Rossford is the village of Perrysburg. At the west, the physical city has pushed farthest beyond the political limits. Ottawa Hills, an entirely residential village, exemplifies the character of this western development.

Toledo's streets, which together with alleys account for nearly a quarter of the total land area of the city, in general are arranged in a grid pattern oriented with the cardinal points of the compass. In the zones bordering the river, however, the streets are aligned with the stream. Interruption of the pattern by the river is so emphatic that no street names carry across the river, and only one thoroughfare (Cherry and Main streets) continues across without interruption (Fig. 1).

On the west bank of the river, halfway between the northern and southernmost limits of the city, is the Commercial Zone (Fig. 1). Here Toledo's trade activity is greatest and reaches its height at the core, known as the Central Business District (Figs. 1, 3, and 18). At the southeast corner of this core area is a marker commemorating Fort Industry, the site of earliest development in the city. In the bordering portions of the Commercial Zone are smaller retail businesses, light manufacturing, wholesaling, and terminal facilities. The latter two activities form a distinct area south of the Central Business District called here the Wholesale-Terminal District (Fig. 18).

In general, the remaining portions of the city are residential. The housing function, however, is interrupted by localizations of manufacturing and commercial nodes and thoroughfares. Additional breaks in the residential pattern result from the numerous railway right-of-ways which roughly converge in the south central part of the city at the point where the New York Central crosses the river. Near this point is Toledo's Union Station.

In many cultural ways, Toledo shows its variety and

strength. The citizens are justly proud of their museum of art and zoological gardens which rank among the country's finest in outlay and quality. The beauties of the municipal university, public library, and civic center contribute to this civic pride. A desire for general improvement is reflected in the non-partisan city manager form of government, the combined city and county planning program, and numerous industrial research organizations.

The city has had progress and a stable growth without the loss of the less tangible but highly important livable qualities.¹ Evidences in support of this contention are the degree of home ownership and the major types of residential structures. No city of Toledo's size or larger in the American Manufacturing Belt (Fig. 2) has such a large percentage (46.2) of owner-occupied dwelling units.² Another outstanding attribute of the city is the high percentage (61.2) of single-family unattached structures. Among American cities of Toledo's size or larger, only Portland, Oregon with 65.8 per cent surpasses it in this respect.³ There are no apartment building sections in Toledo, and only 9.6 per cent of the dwelling units are in structures housing more than four families. This emphasis on individual housing units results in open space and fine lawns in many of the residential areas. Contributing to this appearance are the widely distributed parks which occupy about 1,807 acres within the city.⁴ An abundance of

¹With the marked slowing down of our population increase, there is even a greater need for prudent use and conservation of the physical and human resources of our cities. The substitution of the philosophy and aspiration of quality for that of bigness is needed. Cf. U. S. National Resources Committee, Our Cities: Their Rôle in the National Economy (Washington: Government Printing Office, 1937), p. 73.

²Sixteenth Census of the United States: 1940. Housing, Vol. II, Part I (Washington: Government Printing Office, 1943), pp. 113-15.

³Although Philadelphia long has been known as the city of homes (64.6 per cent one-family structures), it is found on further inspection that only 8.4 per cent are single-family detached units. Toledo actually has a greater number of these structures (50,580) than Philadelphia. The overwhelming type of single family structures in Philadelphia are terraces and the like. Computed from ibid., pp. 120-22.

⁴Of this total, about 1,428 acres are developed. This does not include boulevards, etc. (National Recreation Association, "Recreation Plan for Toledo, Ohio," [Toledo: Toledo Council of Social Agencies, November, 1945], p. 22). (Mimeographed.)

large trees, especially elm, maple, and oak, give nearly all residential areas a parklike appearance.¹ Only at the borders of the physical city, where the fertile soils are or recently have been under cultivation, is this verdant cover reduced. In some portions of this urban fringe, orderly rows of trees are silent evidence of the optimistic platting of the "golden" twenties.²

Among the cities of the American Manufacturing Belt (Fig. 2), Toledo has more similarities to Indianapolis, Columbus or St. Louis than to Pittsburgh, Youngstown or Detroit. Although both a commercial and industrial city, it takes its major character from the former.³ Localization of the heavy nuisance industries, chiefly in a small area east of the river, aids this feature. Of the 99,209 gainfully employed within the city in 1940, 72.7 per cent found livelihood in the three major functions, namely, transportation, manufacturing, and trade (Table 4). Although the tempo of these functions varies, diversity of enterprise proves a stabilizing factor.

A central location with respect to America's second, fourth, and sixth cities--Chicago, Detroit, and Cleveland--encourages Toledo's major functions. The city has been called the "Pivot City of the Great Lakes." This is more than a phrase for it is

The developed park area allows .50 acres per 100 persons. Bartholomew's standard sets 1 acre per 100 persons, but the average for 16 self-contained cities shows 0.479 acres for this density (Bartholomew, op. cit., p. 110).

¹In 1938, a survey was made of trees on city property. It revealed over 99,000 trees in the zone between the curbing and 10 feet beyond the inner edge of the sidewalks. Of this total, 50 per cent were maples and 25 per cent were elms. However, a tabulation of the trees in 10 city parks gives a better picture of the major trees native to the area. Of 21,472 trees, 19 per cent were elms, 18 per cent oaks, and 13 per cent maples. See U. S. Works Progress Administration, "Toledo Shade Tree Census" (Toledo: Works Progress Administration, 1939). (Typewritten.)

²It is estimated that enough lots have been platted in the city and county, so that if one family lived on each lot there would be a population of 1,375,000 (Toledo and Lucas County Plan Commissions, What About Our Future? [Toledo and Lucas County Plan Commissions, 1944], p. 4).

³From the standpoint of employment, the relative importance of industry places practically all major cities of the Manufacturing Belt in this functional category. Toledo has been classified as a moderate manufacturing city by Chauncy D. Harris, "A Functional Classification of Cities in the United States," Geographical Review, XXXIII (January, 1943), 92.

at the hub of this interior commercial empire (Fig. 2).¹ In the initial period of Toledo's history, this situational factor proved powerful enough to offset the unfavorable early site qualities. In the century and a quarter which has elapsed, the excellence of position has proven itself innumerable times in the city's rise to prominence.

Toledo, as has been mentioned, is not located directly on Lake Erie, but it does command its western end and the mouth of the largest river tributary to the Great Lakes--the Maumee. This site on an extensive lake plain is, indeed, an enviable location for a city.² Here there is room for growth and water in unlimited abundance.

The site, however, is less important than the situation. Rail and highway routes focus on this point from many directions and the lake furnishes cheap water transport from and to the north and east. This general statement needs amplification if the high value of Toledo's situation is to be understood.

Routes from the north, and especially from the highly industrialized Detroit area, pass through Toledo to turn the head of Lake Erie enroute to eastern and southeastern points. In its eastern traffic, Detroit has the option of the route across Ontario to Buffalo, but to reach the highly important Cleveland and Pittsburgh segments of the Manufacturing Belt, the routes and the traffic flow through Toledo. From the west, especially from Chicago and St. Louis, important rail routes pass through Toledo to connect with Lake Erie, but even more important, to enter the ever-narrowing corridor of level land between Lake Erie and the irregular terrain of the Allegheny Plateau. Routes from Cincinnati and the highly productive Miami Valley reach Toledo as the nearest point on the Great Lakes. These and other routes from the coal fields of Ohio, Kentucky, and West Virginia bring coal in such

¹In speaking of this region, H. A. Wheeler says: "It is doubtful if any other like area in the world is possessed of more present advantages or so far as we can see for the next fifty years, of more brilliant future prospects," (H. A. Wheeler, Industry's Growth in the Great Lakes Basin, Private edition, The Newcomen Society [1938], p. 10).

²Without the Great Lakes there would be no Toledo. This theory was expressed first in regard to Chicago which has a very similar position on Lake Michigan. See J. Paul Goode, The Geographic Background of Chicago (Chicago: University of Chicago Press, 1926), p. 5.

quantities as to make Toledo the largest coal port on the Great Lakes and, in fact, in the world.

In addition to a focal position with respect to major transportation routes, the city has a central location to many important resources. Toledo is at the northeast border of the fertile Corn Belt and at the southern border of the Hay and Dairy-ing Belt.¹ Approximately 85 per cent of the country's iron ore production lies at the end of a low-cost lake route to the north, and the extensive Middle Appalachian coal fields lie to the south. In all directions are large industrial areas providing sources and markets for processed goods (Fig. 2).

Some of the advantages of situation have been utilized in the growth of the city to the present time. Others probably will promote its development in the future. In neither site nor situation has Toledo as yet reached its full utilization. It has room for development and cause for growth.

As has been stated, the growth and the potentialities of Toledo furnish the reason and the problems of this dissertation. It deals with the major functions which provide employment in the city and metropolitan district and, therefore, pace and govern their growth. An attempt has been made to trace the rôle of the major functions in the present and past development of the city and to suggest in what ways and to what extent they may affect future developments. To obtain these objectives, interest is focused upon (1) the location of the functions in the city and with respect to the region, (2) the influence of the functions upon the pattern of the city, and (3) the rôle of the functions in the growth of the urban complex.

Section 1. Gross Functional Pattern of the City

Toledo's hustle of activity cannot be viewed from the proverbial adjacent hillside, for the city lies on a plain in the center of the lakeward edge of old glacial Lake Maumee.² Perhaps the best vantage point is atop one of Toledo's several modest

¹U. S. Department of Agriculture, A Graphic Summary of Physical Features and Land Utilization in the United States, by O. E. Baker, Misc. Pub. No. 260 (Washington: Government Printing Office, 1937), p. 4.

²This plain was left as the western portion of the lake retreated to the present Lake Erie mean level of 573 feet.



Figure 3. Airview of the Central Business District--Site of Toledo's Initial Development. (Letters designate: (A) Ohio Building, (B) Court House, (C) N.Y.C. Coal Dock, (D) Middle Grounds, (E) Public Housing Project, and (X's) corners of the Central Business District.)

skyscrapers in the heart of the Central Business District (Figs. 1, 3, and 18). From the highest, a twenty-eight story structure (24 floors plus a tower), a reconnaissance examination of the pattern and functions of the city can be made. The building in question is indicated in Figure 3 by the letter "A".

Looking directly below from the above-mentioned tower, one sees Madison Avenue, which extends westward from the Maumee River and evenly divides the Central Business District.¹ As Toledo is the only major urban center in northwestern Ohio, the Commercial Zone, which includes the Central Business District, is the Rialto for the specialized commercial and financial interests of the area.²

As in many cities in this section of the country, our early presidents and the Great Lakes provide names for the downtown streets. The "president" streets parallel Madison Avenue, while the "lake" streets run at right angles to this group and parallel the river. Summit Street, along the crest of the river bank which was much steeper until graded, is an exception to the above system of street names.

At the northwest corner of Toledo's Central Business District is the impressive Lucas County courthouse (see B in Fig. 3). It occupies two blocks which, together with five adjacent blocks to the north, have been developed into a civic center for six local and federal government buildings (Fig. 1).

The edifices bordering the Central Business District on the north are of the 1900 vintage or earlier. Cheap restaurants, taverns, hotels, and idle buildings and men typify this area. One of the city's busiest inter-city highways, Cherry Street, traverses this blighted district and adds but a sordid memory to the tourist. Beyond this thoroughfare to the north was the site of the short-lived village of Vistula, which combined with Port Lawrence in 1833 to form Toledo (Fig. 5). Today it is the center for 1,400 Greek, Syrian, and other Near East-born members of Toledo's popu-

¹This area is described in detail in chap. iii. For a detailed land use map see Fig. 19.

²The Commercial Zone encompasses a greater area and array of commercial activities than the Central Business District. Transportation facilities and light manufacturing also are located in the outer portions of this zone.

lace.¹ This area is bounded on the west by a finger of low-lying land which extends from Maumee Bay southwestward toward the heart of the city and is little used except near its apex. The effect of this physical feature upon the street pattern readily is seen in Figure 1.

East of the Commercial Zone, the Maumee River provides an 800-900 foot barrier.² This waterway is the master stream for drainage of the entire lake-bottom plain and adjacent portions of the gently rolling till plains.³ Along the shore opposite the Central Business District are two of the six giant coal dumpers which stand as monuments to Toledo's ranking world position in the shipment of coal (see C in Fig. 3). Beyond these structures and complementary car storage yard is East Toledo's business center and residential area. Main Street, the primary business avenue, is connected with Cherry Street on the west side by an efficient bascule bridge (foreground in Fig. 3). This major satellite commercial district provides for many of the needs of the "East Siders" and serves as a center for local loyalty to this area.

South of the Central Business District, but within the Commercial Zone, is the Wholesale-Terminal District (Fig. 3).⁴ Wholesaling of food products, freight handling, and warehousing are the major activities here. The once-important Miami and Erie Canal, interurban freight houses, and the site for a number of

¹The median age of the dwelling structures in the census tract of this district is over 70 years. See U. S. Works Progress Administration, Toledo, Ohio: Real Property Survey, Atlas supplement, 1939, p. 4. (Processed.)

²Visitors to the city, knowing of Toledo's importance as a lake port, often are surprised to find that the lake is not even visible from the downtown area.

³The drainage basin of the Maumee River is 6,586 square miles (U. S. Army, Corps of Engineers, Lake Erie and Ohio River Canal, House Doc. 178, 76th Cong., 1st Sess. [Washington: Government Printing Office, 1939], p. 205).

In average daily discharge among rivers flowing into the Great Lakes, the Maumee (31.82 gallons per second) is surpassed only slightly by the Fox River of Wisconsin (U. S. Geological Survey, Surface Water Supply of the United States: 1943. St. Lawrence Basin, Part IV, Water Supply Paper No. 974 [Washington: Government Printing Office, 1944], pp. 59, 123).

⁴Chapter 11 considers the function of this area. For an aerial view and detailed land use map see Figs. 18 and 20 respectively.

early manufactures long have made this district one of much activity. South of the railway freight houses, which occupy a peninsula of land between the river and Swan Creek (D in Fig. 3) is the Union Station. Activity here is always at a high pitch. Bounding the Wholesale-Terminal District on the west are three contiguous housing projects providing over 700 dwelling units for the colored people of an otherwise blighted area (Fig. 1 and E in Fig. 3).

Westward from the Central Business District, commercial development has extended principally along Madison Avenue and parallel streets. Automobile showrooms and lots and wholesale distributors are most numerous here. Many once-fine residences have been converted into apartments, rooming houses, and commercial sites. Unless the area becomes entirely non-residential, except for hotels, it appears that a twilight zone will continue to develop. The centrifugal force of commercial activities expanding principally westward has been the agent in a gravitation of the hub of Toledo's Central Business District from Madison Avenue and the river bluff to a position several blocks inland.

As one looks into the middle distance, the rich growth of elms and maples obscure much of the housing function which occupies the major portion of Toledo's 37.45 square miles of land.

Radiating from our observation point in nearly every direction through the residential districts are commercial ribbon developments (Fig. 1). Occasional knots of greater activity occur at major intersections along the routes (Fig. 1). As one looks farther afield, the ages of the homes decrease, rents and ownership increase and, in general, the appearance improves.¹ To the west, however, the residential area is bisected by a band of industry along the New York Central's Detroit-bound tracks (Figs. 1 and 23). As might be expected, many of the plants produce automobile parts. Balancing this manufacturing belt on the east are the riparian sites, lakeward of the forementioned coal docks. A location here proves advantageous to a number of industries which receive or send much of their materials via the lakes or make

¹Home ownership increases to over 50 per cent in practically all the census tracts along the border of the city. This is in contrast to a figure under 30 per cent in all eight tracts which include and adjoin the Commercial Zone. See various maps in Works Progress Administration, Toledo, Ohio: Real Property Survey, p. 8.

large use of the raw river water.

With the aid of binoculars, one can next reconnoiter the urban-rural fringe. In every direction, this zone of transition lies beyond the corporate limits, for Toledo's functions have outgrown or have found it desirable to locate beyond these man-made boundaries. A belt line railroad (Toledo Terminal) roughly defines these limits. The view one encounters in the different sections of this fringe varies widely.

Peering northward to the Michigan state line, two functions appear dominant--large new industrial plants and small new homes. Both have found the availability of cheaper land desirable. Toledo's two major war-generated plants are located here as well as the new sites of several of the city's long-established industries. Near Maumee Bay is the most recent major addition to the city--Point Place (Figs. 1 and 6).¹ This community extends to the state line and is nearly surrounded by water bodies or marsh and other low-lying lands. Poor drainage characterizes much of the lake border area. The major highways which extend through the northern fringe are the corridors for a dense highway flow to and from Detroit and vicinity. Four railways supplement these routes.

The transition zone on the East Side is in many places an industrial-rural one. The extensive flat lands are necessary for a number of the activities located here. In the north is a great coal dock and coal car storage yards (Figs. 1 and 16), and also the numerous storage tanks of four national petroleum refiners. Toledo's other coal and ore docks and accompanying storage yards soon will be relocated in this area. Eastward along the lake front is the village of Harbor View having homes of moderate to low quality. As one's view moves southward, another large petroleum refinery appears and then a huge glass plant and a maze of freight yards.

The southern fringe of the city lies on both sides of the Maumee River, the two parts presenting a marked contrast--one industrial, the other fine residential. The former is east of the river and is characterized by more freight yards, the site of a large Army ordnance depot and Rossford, the glassmaker's suburb of Toledo (Fig. 1). Choice river frontage in the western part of this village (Eagle Point subdivision) and to the south, however,

¹This area (1.8 square miles), with a population of 4,800 (1940), was annexed to the city in 1937 after considerable

is given to large estates and spacious homes. The opposite shore presents a similar view of wealth. The quiet residential suburb which borders Toledo on the west bank is Maumee, already incorporated at the time of Toledo's founding.¹

To the west, the zone of transition from city to country is less regular. Along the major highways are residential plats with intervening tongues of agricultural lands. The soils of the area change from the silts and clays of the lake plain to the sands of former bars and beaches. A few miles farther west, the Oak Openings provides an extensive belt (133 square miles) of this light-textured soil which is only about 50 per cent in cultivation.² The fine homes of the adjacent village of Ottawa Hills lie in this western fringe area (Fig. 1).³ In close proximity is the city's beautiful center of learning--The University of Toledo, a municipally-owned institution which had a total enrollment of more than 5,900 in the fall, 1946.

Residential development has been most consistent in this western borderland, and expansion of Toledo's political limits appears certain to continue in this direction. A result of this residential growth has been the numerous roadside stands and stores along the main highways beyond the city. They exemplify the unruly ribbon development which occurs when adjacent political units make no provision for zoning.

Section 2. The Natural Base for the Functions

Toledo lies at the lakeward edge of the largest lacustrine plain bordering the Great Lakes. This position at the head of Lake Erie makes the city the lake gateway to a large section of

controversy.

¹Toledo's suburb type has been classified as "complex with residential more important." For a comparison with the suburbs of other metropolitan districts, see Chauncy D. Harris, "Suburbs," American Journal of Sociology, XLIX (July, 1943), 1-13.

²See U. S. Department of Agriculture, Soil Survey of Lucas County, Ohio, Series 1934, No. 24 (Washington: Government Printing Office, 1943), pp. 28-31.

³This village has the highest average monthly rental (\$122.77) of any minor civil division in Ohio. Although 83 per cent owner occupied, the omnipresent fine homes make the figure significant (Sixteenth Census of the United States: 1940. Housing, Vol. I, Data for Small Areas, Part II, p. 233).

the fertile Central Lowlands of the United States.¹ In this respect, the city corresponds to Chicago, which is at the head of a lake and is another water gateway to the interior. With the western edge of the Appalachian Plateau but a short distance to the east, Toledo is at a point where railways can fan out to the north, west, and south.

The glacial silts and clays of old Lake Maumee emerged with the retreat of the waters following the Wisconsin or last glacial ice sheet. This lake floor is without any prominent relief features and slopes toward Lake Erie at about five feet per mile.²

Toledo's lake-border, lake plain location has provided the city with a group of physical qualities some of which are different from those of any other site in the lake plain of northwestern Ohio and adjacent southeastern Michigan.

As suggested by the imperceptible slope of the lake plain, natural drainage in the Toledo area has been poor. Of all the elements of the natural landscape, this has been the only one adverse to human occupance. Although now largely corrected, settlement, except in limited areas, has had to await extensive drainage.³ The most notorious portion of the plain was the Black Swamp, an area of more than 3,000 square miles, described as being between the Maumee and Portage rivers east of Toledo.⁴

¹N. M. Fenneman, Physiography of Eastern United States (New York: McGraw-Hill Book Co., 1938), p. 456.

²The uniformity of this plain is illustrated well on the United States Geological Survey, Point Place Quadrangle and Walbridge Quadrangle (Washington: U. S. G. S., 1938), Scale 1:31,680, Contour interval 5 feet.

The highest precise elevation in the city is at Detroit Avenue and Copland Boulevard where the elevation above mean sea level is 626.6 feet. This is 56 feet above the low water datum for Lake Erie. Data from Toledo City Journal, December 20, 1930.

³The heavy glacial clays of this potentially fertile but low-lying lake plain provided the material for drain tiles. The gas south of Toledo was a cheap fuel for this manufacture.

⁴In 1853, legislation was passed providing for the indiscriminate drainage of the Black Swamp without regard to the ultimate land use. See Harlow Lindley et al. Ohio in the Twentieth Century, 1900-1938, Vol. VI of The History of the State of Ohio, ed. C. Wittke (6 vols.; Columbus: Ohio State Archaeological and Historical Society, 1941-44), p. 230.

Toledo News-Bee, August 14, 1931.

Perhaps the best measure of the widespread need for drainage in the Toledo area is the fact that 72 per cent of Lucas County (excluding Toledo) is in drainage enterprises. In adjoining Wood and Ottawa counties, the figures are 98 and 76 per cent respectively.¹

In 1944, the water table was reported to have dropped 2.6 feet in the Toledo area, but this has no effect upon Toledo's water supply which is drawn from Lake Erie.²

The drainage pattern of the region is one of northeastward-flowing parallel streams. As a result, the Maumee River has few tributaries in its lower course although it is the major stream of the lake plain, having developed along the axis of the basin.³ This valley and its few tributaries, together with Ten Mile Creek which flows into Maumee Bay, form the only relief features in the city. The Maumee Valley, in the stage of early maturity, is thirty-five to fifty feet in depth and from one-quarter to one-half mile in width. The eleven and one-half miles through Toledo is slack water.⁴

Land in the vicinity of the bay is low-lying and marshy, while the waters in the bay are in many places only five or six feet deep several miles offshore. This has resulted in the need for deepening and maintaining a channel through the bay as well as in the river. Along the south border of Maumee Bay, shore erosion is critical. The average annual loss was 11.78 feet in one

¹The acreage is based on the area assessed. Figures are computed from Sixteenth Census of the United States: 1940. Drainage of Agricultural Lands, pp. 371-73. Map of drainage area on p. 363.

²Toledo Blade, February 16, 1945.
Some Toledo companies utilize underground water supplies, particularly due to their lower temperatures.

³The first outlet of the glacial lakes was at the head of the Maumee River at Ft. Wayne, where a low divide now separates it from the southwest-flowing Wabash River. From Ft. Wayne to Lake Erie is a fall of about 177 feet in 109 miles. See Charles R. Dryer, "The Maumee-Wabash Waterway," Ann. Assn. Amer. Geog., XI (1919), 41-51.

⁴Strong winds from an easterly or westerly direction will ordinarily raise or lower the river level from 4 feet above to 2 feet below low water datum (U. S. Army, Corps of Engineers, Board of Engineers for Rivers and Harbors, The Port of Toledo, Ohio, Lake Series No. 7, rev. ed. [Washington: Government Printing Office, 1939], p. 2).

section over a ninety-six year period.¹

The major secondary streams are Swan, Ten Mile, and Grassy Creeks (Fig. 1). These streams and their abandoned valleys have played a significant rôle in the utilization of land in Toledo.²

Swan Creek has contributed most through its strategic position at the confluence with the Maumee River. Here the embryo for Toledo occurred (Figs. 3 and 5), and it also marked the major terminus of the Miami and Erie Canal. The lower course of this creek formerly passed through what is now the Central Business District. Filling the remnant marshland was a prerequisite to the growth of the city.³ Northward from the Commercial Zone, part of the fossil stream course now is used by railroads and a few industries and the remainder is vacant. This lowland influenced the route of the short-lived Miami and Erie Canal Manhattan extension, which entered the river at the south end of Bay View Park.

Although the earlier course of Grassy Creek passed through East Toledo, today it enters the Maumee River at Rossford south of Toledo (Fig. 1). Railroads and parks utilize part of the earlier course, and the rest comprises the marshlands and course of Otter Creek. Nearby Duck Creek is a similar zone of inundated land. Together they have formed an effective barrier to expansion in the Ironville district of northern East Toledo.

The meandering course of Ten Mile Creek with its wide bottom lands has provided the site for an extensive chain of parks through Toledo (Fig. 1). Until the 1920's, this creek marked the limit of major population expansion westward and northward in

¹In 1930, 40 feet were lost. See G. W. White and W. H. Gould, "Erosion of Lake Erie Shore," Ohio State University Engineering Experiment Station News, XVII (April, 1945), 5 and U. S. Congress, House, Beach Erosion Study, Ohio Shore Line of Lake Erie from Ohio-Michigan State Line to Marblehead, Ohio, House Doc. No. 177, 79th Cong., 1st Sess. (Washington: Government Printing Office, 1945).

²Until very recently, in geologic terms, Swan and Grassy creeks continued their parallel courses to the mouth of the Maumee River. For an account of the changes in their courses see J. E. Carman, "Drainage Changes in the Toledo Region," Ohio Journal of Science, XXX (May, 1930), 187-93.

³The area of the former creek bottomland still is roughly defined by the slight upgrade eastward and westward from about Ontario Street along Jefferson and Madison avenues.

Toledo. In its lower course, where much of the adjacent lands are marsh, the stream is called the Ottawa River.

The lake plain in which Toledo is located gives rise to soils which are far different from those in the till plains adjacent to this old lake bottom.¹ Much of the best land of Ohio is found here in sharp contrast to the rough unglaciated southeastern part of the State and to the till plains of older glacial periods in the southwestern section. Glacio-lacustrine deposits of silt and clay cover most of the plain. In the Toledo area, an exception is a belt of fossil beach or lake-border deposits of sand west of the city. Here the flat topography is relieved by low, rounded hills or undulations. Some of the economic reflections of the soil variation are considered in Chapter iii.

The soils also have affected the vegetation of the sand area.² As a broad distinction, the terms "oak openings" and "timber" divide the natural vegetation of the deep sand from the silt, clay, and shallow sand areas.³

Bedrock has a thick cover of surficial material in Toledo (95 feet in the downtown area). However, in the vicinity of the city the outcropping or near-exposure of various strata of dolomite and sandstone have encouraged quarrying with the result that this industry provides a substantial contribution to the economy

¹The whole lake plain has been classified as belonging to the Toledo-Vergennes association of Wiesenböden, Ground water Podzol and Half-Bog soils (U. S. Department of Agriculture, Soils and Men [Washington: Government Printing Office, 1938], insert map). According to environment most of the soils of this same area are classified in the Clyde groups (U. S. Department of Agriculture, Atlas of American Agriculture, Part III, "Soils of the United States," by C. F. Marbut [Washington: Government Printing Office, 1935], Plate 5, sec. 7 and p. 39). For a detailed study of the Toledo area based on texture of soils, see U. S. Department of Agriculture, Soil Survey of Lucas County, Ohio, Series 1934, No. 24 (Washington: Government Printing Office, 1943).

²For a study of the vegetation and a map showing the extent of the Oak Openings, see E. L. Moseley, Flora of the Oak Openings west of Toledo, Special Paper No. 20 of the Proceedings of the Ohio Academy of Science, VIII, Part III (March, 1928), 81-134 and Louis W. Campbell, "The 'Oak Openings' of Northwestern Ohio," The Historical Society of Northwestern Ohio Quarterly Bulletin, V (April, 1933). The latter article was reprinted by the Toledo Metropolitan Park Board in May, 1946.

³Geological Survey of Ohio, Geology, Part I of Geology and Paleontology, Vol. I (7 vols.; Columbus: Geological Survey of Ohio, 1873-93), p. 585.

of the area.¹ A number of quarries extend in a north-south belt about seven miles west of the city, and another large group is found to the southeast.² In 1939, Lucas County ranked seventh in the State in the production of limestone and dolomite.³ Most of that quarried is used for road metal, railroad ballast, Portland cement, and in concrete. Friable Sylvania sandstone occurs in the Silica, Ohio quarries, but this has not been used for glass sand since about 1905.⁴ In the late 1800's, a minor amount of petroleum was obtained in the eastern portion of the city. However, the major oil and gas deposits have been a number of miles to the south.

The average growing season for Toledo is 185 days (April 20--October 22) or more than 25 days longer than in nearby towns.⁵ Proximity to the tempering conditions of the lake accounts for this feature. However, in other respects the humid continental climate with long summers is similar to that of the general region. The range in average temperature is from 26.3°F. in January to 73.6°F. in July. A temperature of 90° or higher is reached on an average of eleven days per year. Precipitation is well distributed ranging from 1.9 inches in February to 3.4 inches in June for an average annual totaling 31.5 inches. January has the greatest monthly snowfall accounting for 8.2 inches of the 30.6-

¹For a brief survey of the formations in northwestern Ohio, see J. E. Carman, "The Monroe Division of Rocks in Ohio," Journal of Geology, XXXV (August-September, 1927), 481-506.

The exposure of bedrock in the river course above Toledo, by preventing upstream navigation, gave immeasurable aid to the city in its early competition with upriver rivals.

²Toledo lies along the crest of a geanticline widely known as the Cincinnati Arch. As the crest of this structure has been eroded away, the oldest formations are exposed here with successively younger strata appearing eastward and westward.

³Geological Survey of Ohio, Dolomites and Limestones of Western Ohio, by Wilber Stout, Fourth Series, Bull. No. 42 (Columbus: Geological Survey of Ohio, 1941), p. 7.

⁴Walter G. Lezius, "Geography of Glass Manufacture at Toledo, Ohio," Economic Geography, XIII (October, 1937), 405.

⁵The growing seasons for three towns within 25 miles of Toledo are: Monroe, Mich.--159 days, Wauseon, Ohio--155 days, and Bowling Green, Ohio--158 days. Columbus and Dayton, each over 120 miles to the south, have only 2 and 4 more days respectively than Toledo (U. S. Department of Agriculture, Climate and Man [Washington: Government Printing Office, 1941], pp. 916, 1056-57).

inch average yearly total.¹ The average wind velocity of 11.1 miles per hour is prevailing from the southwest during eleven months of the year.² Lying in the pathway of the storms which sweep across the lake region results in a climate characterized by frequent and rapid weather changes. The occasional "northeasters" bring stormy weather and raise the water level in the lower Maumee River. Heavy fogs only occur on the average of seven days of the year, but the city receives only 50 per cent of the total possible sunshine.³

Thus we find Toledo and vicinity endowed with many natural site advantages as well as with an excellent regional position. Though the low swampy terrain proved an early handicap, even to the extent of hampering the eastern land approach to the city, this problem could be solved readily. With this fault removed, the development of the area rapidly gained momentum.

Section 3. The Sequent Development of the City

In 1947, Toledo will celebrate 110 years of incorporation and 130 years of development. During this period of growth, the community has changed from a frontier settlement on a swampy plain to an important industrial, transportational, and commercial center. Today, these functions are ubiquitous to the urban centers of the Manufacturing Belt. However, in kind, degree, and develop-

¹Ten inches of melted snow approximates 1 inch of rainfall.

Although snow does not prove a major handicap to urban activities, it costs the taxpayers, on an average, about \$20,000 per year for its removal from the streets. See City of Toledo, Financial Report of the City Auditor (Toledo: Comm. of Publicity and Efficiency, Annual).

²In 1945, the prevailing wind was from the southwest, west or south on 210 days or 58 per cent of the year. Computed by the writer from U. S. Weather Bureau, Monthly Meteorological Summaries for Toledo, Ohio. (Mimeographed.)

The alignment of prevailing wind and river course has been a significant factor in Toledo being the earliest port on Lake Erie to open. The average date for 10 years is February 21st (U. S. Lake Survey Office, War Department, Survey of Northern and Northwestern Lakes, Bull. No. 54 [Washington: Government Printing Office, 1945], p. 415).

³Data in this paragraph, excepting where other sources are given, is from U. S. Weather Bureau, "Annual Meteorological Summary for Toledo, Ohio, 1945" (Toledo: U. S. Weather Bureau, 1946). (Mimeographed.)

RATE OF POPULATION CHANGE FOR EIGHT EAST NORTH CENTRAL CITIES

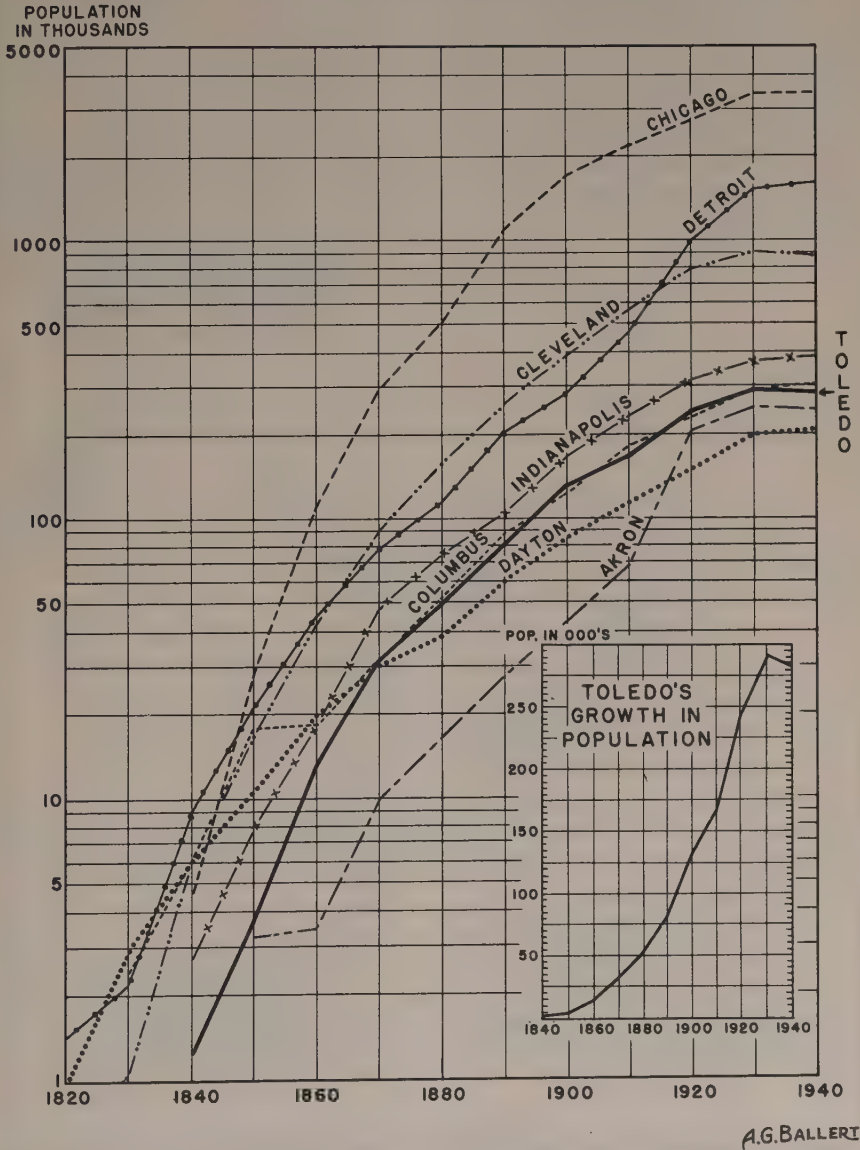


Figure 4

ment there is much individuality among the centers.

Toledo's population growth, as shown in the inset in Figure 4, was one of continuous increase from the first census in 1840 until 1930. During the 1930's, the city suffered its first loss in population with a decrease of over 8,000 to a figure of 282,349. Since the Census of 1940, Toledo has erased this loss and has added at least several thousand persons. During the decades of 1890 to 1900 and 1910 to 1920, the sharpest rises in population occurred.

In rate of population change, Toledo has followed a pattern more like that of Cleveland and Indianapolis than of any of the other cities shown in Figure 4. Toledo passed Dayton in population in 1870, and it has vied with Columbus for third place among Ohio cities since that date.¹

The three primary functions of Toledo--manufacturing, transportation, and commerce--each have provided the city with a special impetus at different periods. Commerce was the earliest prime function of the city, and industry is the present leader if a source of livelihood for the largest segment of the populace is used as the criterion. Transportation has been allied closely and has developed with the other primary functions, but at certain periods, such as the canal, early railroad, and interurban eras, the importance of this function was especially prominent.

Toledo's initial point of attachment was along the Maumee River near the lakeward limits of a 12-mile square reservation ceded to the United States in 1795.² Some of this land was surveyed, and in 1817 it was sold by tracts. Thus came into existence Port Lawrence, at the confluence of the river and Swan Creek (Fig. 5). This location earlier had been the site of Fort Industry, a military post about which little is known. Having selected the stage, the setting now was to be instituted for the functions which were to follow.

In the two decades from the founding of Toledo to its in-

¹For an analysis of the growth of Toledo and Columbus, see Walter G. Lezius, "A Comparison of the Geographic Factors Affecting the Population Growths of Columbus, Ohio and of Toledo, Ohio" (Unpublished Ph. D. dissertation, Dept. of Geography, Ohio State University, 1940).

²By the Treaty of Greenville, 16 small tracts beyond United States territory were acquired from the Indians for military purposes.

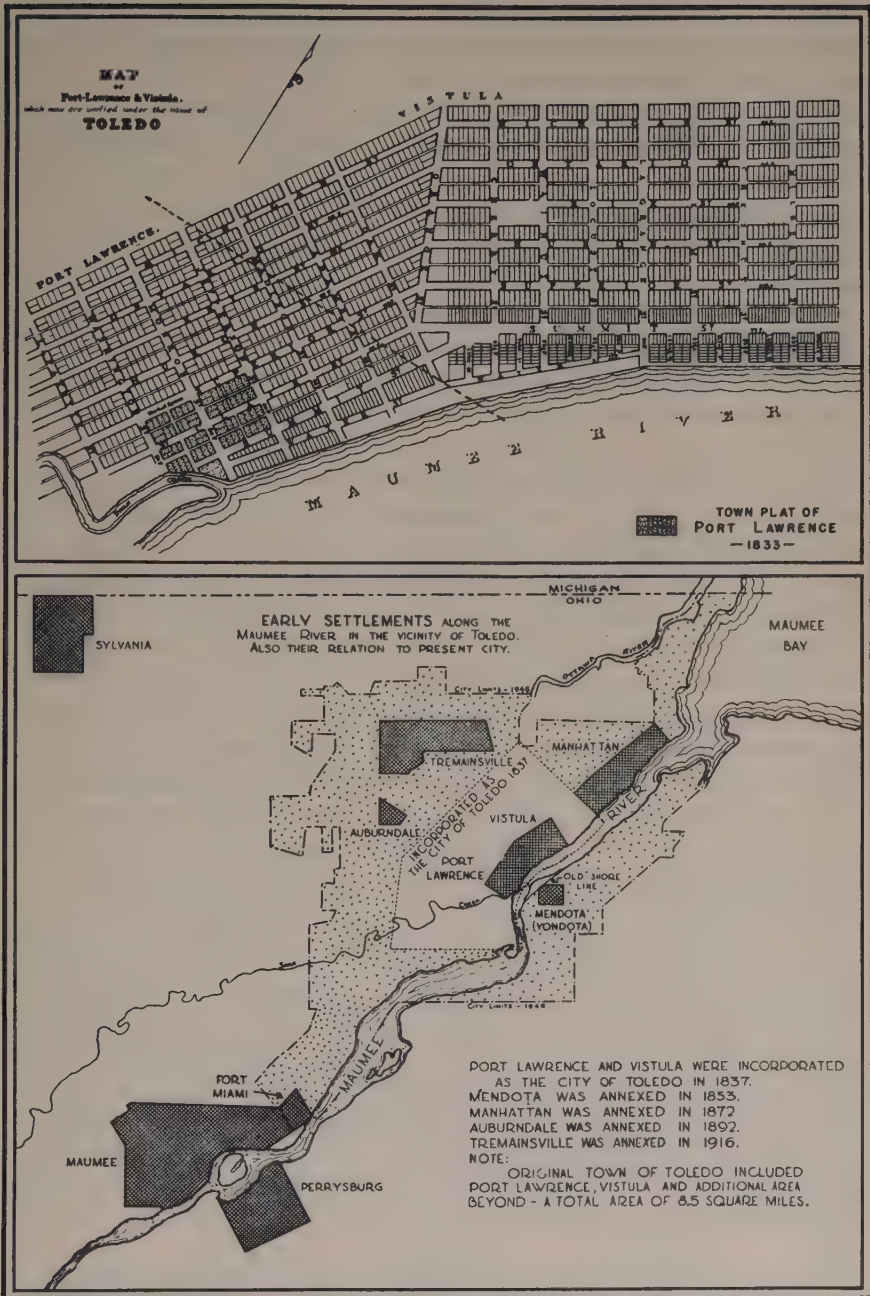


Figure 5. Early Settlements in Relation to Toledo

corporation (1817-1837), there was competition from nearby river-front communities and question as to the state having sovereignty over Toledo. Other river sites, such as Manhattan, Lucas City, Oregon, Marengo, Maumee, and Perrysburg, publicized their positions and attempted to get settlers and means of transport to justify their claims as future commercial metropolises. All but the latter two communities since have been absorbed by Toledo. Events which were to be decisive in Toledo's function as a commercial and transportation center were taking place. Important among these were (1) the finding that Port Lawrence was the practical head of Maumee River navigation for lake vessels (above this point the river became shallow and tortuous), (2) the uniting of Port Lawrence and the adjacent downriver settlement of Vistula to form Toledo in 1833 for the purpose of consolidating strength,¹ (3) the surveying of the canal routes with Toledo as the likely northern terminal, (4) the inaugurating for business of the first railroad to the interior with Toledo as its lake terminal, and (5) the settling of the Ohio-Michigan boundary in 1836 after the bloodless Toledo War.² The last-mentioned item appears to have been largely precipitated by the recognition of Toledo's strategic position for commerce.

The period from 1837 to 1852 marks an era in which Toledo's site provided the dominant factor for its sole major function--that of a commercial center or, more accurately, a transfer point.³

¹At that time, no other town in North America bore this name. Now there are small communities in four states--Illinois, Iowa, Montana, and Oregon--which have this Spanish name.

²An Act of Congress authorizing the formation of the State of Ohio set the northern boundary as a line drawn due east from the southern extremity of Lake Michigan until it intersected Lake Erie. However, a provision was made that if the line intersected Lake Erie east of the mouth of the Maumee River, the line could be moved north to the most northerly cape of Maumee Bay with the assent of Congress. By the original designation, the present Wood-Lucas County boundary (nearly 8 miles south of the present state line) would have marked the northern limits of Ohio. When the disputed territory was awarded to Ohio, Michigan was given the upper peninsula as a compensation. For a full account of the boundary controversy, see Carl W. Balsam, "The Ohio-Michigan Boundary Settlement" (Unpublished Master's thesis, University of Toledo, 1935).

³This has been the first step in the rise of nearly every city on the Great Lakes or as Whitbeck states more broadly, "Nearly all American cities began as local centers . . . collecting

Toledo was an entrepôt between the new agricultural West and the industrially-developing East. Merchandise and emigrants moving westward via Lake Erie found Toledo at the westernmost extent, with two canals and a railway into the interior, an ideal terminus.¹ The potentialities of the hinterland only needed access to outside markets to prove their value. With this available, eastward traffic developed to reassure the city's position. Grain was of major importance in this movement. A natural outcome was the rise of milling and storage elevators where the break-of-bulk occurred. At this period, Toledo's lake receipts of commodities of the region were minor. Such a trade in raw materials awaited the needs of industry on a grander scale.² At the end of the period under consideration, Toledo was a thriving community of about 5,000 persons (3,829 in 1850).

The next three decades (1852-1882) may be taken as Toledo's railroad building era. By 1882, some fourteen rail routes fanned out from the city in all directions. Although several lines were yet to come, Toledo was approaching her maturity as to the number of these facilities. Also the local rail pattern, which was to affect greatly the future land use of the Toledo area, largely was completed at this time. Throughout the railroad period, however, the traffic of this facility remained relatively light.³ Lake transportation probably had its maximum influence upon Toledo during the thirty years being considered although, from the standpoint of tonnage, it was but a small fraction of the present volume.

Up until the 1850's, rail lines of the country had served as short, independent units which linked several cities or extended into their hinterlands. Soon these links were united, and Toledo was connected with Chicago in 1852, with Cleveland and the East in 1853, and with the Mississippi and Ohio rivers by 1859. By 1860,

and shipping produce of the region, and receiving and distributing goods demanded by the region; that is, middlemen's centers" (R. H. Whitbeck, "Geographic Factors Affecting the Growth of American Cities--A Synopsis," Jour. of Geog., XXI [September, 1922], 205).

¹See chap. 11 for a consideration of the character of the traffic which used these facilities.

²Cf. Anna F. Randolph, "The Cultural Geography of Toledo, Ohio" (Unpublished Master's thesis, Miami University, 1938), p. 31.

³Cf. W. F. Gephart, "Transportation and Industrial Devel-

the canal traffic was succumbing rapidly to the railway wherever competition arose.

The Civil War brought a lull in the rail-net development, but in the years following the conflict, connections were made with the abundant timber and coal resources to the north and south of the city. During the 1870's, rail lines were extended into central Michigan. This provided direct routes from the great pine regions, which were highly important to Toledo's trade and early industry.¹ At about the same time, several rail connections were made with the coal fields of southern and eastern Ohio and Pennsylvania.² With a plentiful supply of fuel, the city's war-encouraged industries could face a bright future.³ Consolidations were taking place among the railways which resulted in the inauguration of through service on the trunk lines. Toledo's rôle as a terminal point in the rapidly developing rail pattern had been well established, however, and it was to remain. These factors were most significant in the rise of Toledo's primary functions.

Before the end of the railroad building era, Toledo had expanded in all directions from its original 8.49 square miles to 25.82 square miles (Fig. 6), and in 1880 the population of the city had passed 50,000.⁴ The towns of Ironville and Manhattan on

opment in the Middle West," Studies in History, Economics and Public Law, Vol. XXXIV, No. 1 (New York: Columbia University, 1909), p. 204.

¹In 1870, there were 2,204 persons employed in manufacturing in Lucas County. Of this total, over 40 per cent were engaged in sawing lumber and making wood products. Flour mill products, however, contributed nearly one quarter of the value of manufactured products. Computed from Ninth Census of the United States: 1870. Statistics of Wealth and Industry, Vol. III (Washington: Government Printing Office, 1872), pp. 557, 716.

Attempts to establish Toledo as a furniture manufacturing center failed because of the rapidly depleted local timber resources and keen competition from successful centers elsewhere. See Lezius, "A Comparison of the Geographic Factors Affecting the Population Growths of Columbus, Ohio and of Toledo, Ohio," p. 87.

²By 1881, Toledo had four railroads tapping this coal region. The rapid increase in coal receipts at Toledo are shown by the following tonnages: 1880--441,202 tons; 1881--1,244,703 tons (Manufacturing and Mercantile Resources of Toledo, South Toledo, and Perrysburg [1882], p. 699).

³Cf. Gephart, op. cit., p. 258.

⁴The 17.33 square miles added during this period were greater than all of the annexations from that time to the present (15.80 square miles).

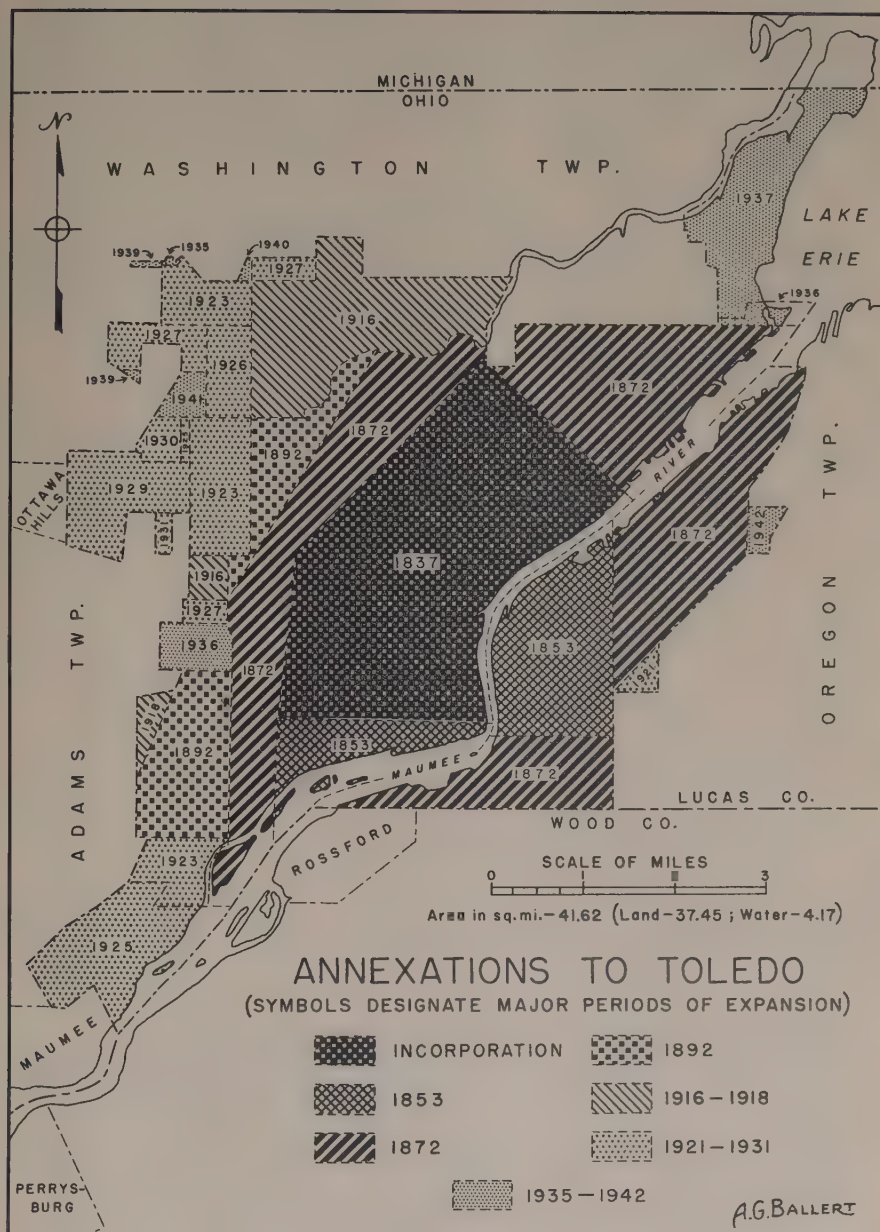


Figure 6

the east and west banks of the lower Maumee were included in the extensive acquisitions of 1872. Practically all of the present 8.08 square miles of East Toledo were incorporated by this time (Fig. 6).¹ The city now had annexed all the land adjacent to the navigable portion of the river which, at the time, provided the most desirable industrial sites.

The year 1883 is arbitrarily used to mark the beginning of Toledo's rise as an industrial center. Perhaps this date is several years premature, but the reduced activity in railroad construction and the steady but unspectacular growth of manufacturing by this time makes the date convenient. Between 1880 and 1890, the value of manufactured products and the capital invested in this activity each had more than doubled. However, more significant was the change in the character of the leading manufactures. Table 1 shows this trend of the major industries from using local materials requiring few operations to the use of processes and sources of material which took a wider scope.

As Toledo's industrial period got under way, the city began to profit more fully from its continually improving facilities and strategic situation as a lake and rail terminal point.² Figure 7 shows the extensive development of rail and water transportation facilities along both banks of the Maumee River in 1888. Although the grain traffic of the port decreased in relative importance as Chicago rose in this trade, Toledo's transportation lines tapped new resources. These were reflected in the developing traffic of the port (Table 2).

The railroad to the central Ohio coal field, opened in 1876, introduced more than a cheap fuel to Toledo. Here was a new surplus commodity for transshipment. Lake receipts of Michigan timber had been mounting for several decades and reached their peak with the lumber boom beginning in the 1880's. Unlike lum-

¹The area includes the eastern half of the Maumee River. Of this total, the land area amounts to 6.75 square miles. Only .31 square mile of the present area of East Toledo was added after 1872. The most recent addition was the waterworks property along the northeast city limits in 1942. All measurements were made by the author using a polar planimeter on U. S. Geol. Survey topographic maps, scale 1:31,680. Checked on Toledo City Plan Commission map, scale ca. 1:27,850.

²Cf. E. O. Randall and D. J. Ryan, *History of Ohio*, Vol. V (5 vols.; New York: Century History Co., 1912), pp. 311-12.

ber, which shortly thereafter became principally a rail receipt, the increasing Superior iron ore receipts were to be of continuing significance (Table 2). Hence, by the twentieth century the present major commodities in Toledo's water commerce--coal and iron ore--were well established, but the position of the former was yet to be enhanced greatly.

TABLE 1

COMPARISON OF LEADING TOLEDO INDUSTRIES IN 1880 AND 1890^a

Based on Adult Employment			
1880		1890	
All industries	6,048	All industries	10,313
Lumber processed and products ^b	835	Carriages and wagons	603
Foundry and machine shop products	257	Foundry and machine shop products	566
Liquors, malt	245	Hosiery and knit goods	430
Based on Value of Products			
1880		1890	
All industries	10,600,074	All industries	21,651,574
Lumber processed and products ^b	1,428,269	Coffee and spice products	2,830,000
Liquors, malt	827,164	Liquors, malt	1,605,859
Tobacco	751,000	Flour and grist-mill products	1,481,447
Flour and grist-mill products	619,720	Foundry and machine shop products	966,628

^aSources: Tenth Census of the United States: 1880. Report on the Social Statistics of Cities, Part II, pp. 425-26; Compendium of the Eleventh Census of the United States: 1890, Part II, pp. 1008-09.

^bIncludes lumber planed and sawed, sashes, doors, blinds, and furniture.



Figure 7. Toledo in 1888

TABLE 2

CHANGE IN THE BULK TRAFFIC OF THE PORT OF TOLEDO, 1885-1910^a

Products	1885	1890	1895	1900	1905	1910
Lumber ^b (M ft.) R	230,000	192,000	159,000	95,526	39,818	19,390
Corn (bu.) S	.....	6,419,130	.....	3,744,900	494,500	(None)
Wheat (bu.) S	.....	3,053,932	.....	1,947,400	1,020,000	84,000
Wheat (bu.) R	.....	(None)	.....	251,500	266,700	665,839
Iron Ore (Tons) R	15,000	164,295	260,730	633,776	1,009,549	1,166,198
Coal (Tons) S	.....	940,000	716,099	1,085,563	2,112,346	4,112,262

^aFigures for 1885 and 1895 from G. G. Tunell, Transportation on the Great Lakes of North America (Washington: Government Printing Office, 1898), pp. 77, 89, 103. Figures for 1890 from U. S. Congress, House, Report on Internal Commerce of the United States, Exec. Doc. 6, Part II, 52d Cong., 1st Sess. (Washington: Government Printing Office, 1892), pp. xxiii-xxvi. Figures for 1900 to 1910 from U. S. Department of Labor and Commerce, Monthly Summary of Commerce and Finance of the United States, December, 1900, 1905, 1910 (Washington: Government Printing Office), *passim*.

The letter "R" or "S" following each product indicates receipts or shipments.

^bIn 1857, there were some 35,000,000 feet of lumber received from the pinneries of Lake Huron (H. L. Hosmer and W. H. Harris, Toledo Directory, 1858 [Toledo: Riley & Co., 1858], p. 280). About 20,000,000 feet of lumber were distributed beyond the immediate locality and as far away as Missouri and Kansas.

Industries which had been organized in the last decade of the rail building period were beginning to spread their names and also Toledo's. The first factory of major size to become established was the Milburn Wagon Company which moved from Mishawaka, Indiana in 1875.¹ In 1880, the Gendron Wheel Company was founded and was later to become the world's largest manufacturer of children's vehicles. The claim to being the originator of the wire wheel was held by this company. The character of such early in-

¹The location, on Monroe Street just west of the present baseball park, abutted on the Michigan Central Railroad leading to Detroit. Residential development followed in the adjacent area, and in 1892 the Auburndale district was annexed by the city (Figs. 5 and 6).

dustries foreshadowed those which were to follow. Most of the industries, especially those of the machine shop type, chose sites along the border of the area now designated as the Central Business District.

Mineral resources of the vicinity contributed greatly to Toledo's industrial growth until the turn of the century. The development of the oil and gas fields of northwestern Ohio in the latter 1880's provided the impetus for two of Toledo's greatest industries--glass manufacturing and petroleum refining. Although the local supplies of gas and oil now practically are exhausted, the early stimulus, supported by a prime position, has made the city a leader in both the glass and petroleum refining industries.

By 1900, Toledo truly had taken on the workshop air.¹ From a total population of 131,822, the number of wage earners stood at 15,383 with 1,991 in foundries and machine shops. More than 2,300 found livelihood in the manufacture of transportation equipment.² Flour and grist-milling was the only primary type of manufacture to remain among the leaders. At this date (1900), the number of manufacturing establishments was at an all-time high (1,050), but the average number of workers per factory was only fifteen. The decade which followed brought expansion to the leaders, but the industrial complex appeared much the same.

Accompanying the industrial rise of the city was an addition to the transportation facilities. This service, the electric interurban, in turn soon gave much momentum to Toledo as a wholesale center. Through the first twenty years of the new century, Toledo grew rapidly as a hub for both activities. However, the developing automotive industry, which contributed greatly to the city's trade and employment, proved to be the doom of the interurban lines.

The new industrial giant, the automobile industry, had

¹In literal terms, this fact also was true. The industry was sufficient in 1892 to create a smoke nuisance. A committee on smoke abatement made a trip to Chicago to investigate the possible solution of this problem. Letter from the committee to Mr. I. D. Smead, Chairman of the Manufacturers' Committee, dated December 20, 1892 (MS in John Crerar Library, Chicago).

²Bicycles--912; carriages, wagons, and their materials--801; railroad car construction and repair--606. Figures are from Twelfth Census of the United States: 1900. Manufacturing, VIII, Part II, 720-21.

its start in Toledo several years after the turn of the century, but it was not until about 1910 that the business became significant. By 1915, it was the community's leader by virtue of one company, the Willys-Overland.¹ Many industries which were ancillary to Willys or the general automotive field soon found Toledo a strategic location. Accompanying the new industrial emphasis was the greatest population growth in the city's history. The total increase for the decade was 75,667 persons or an average annual increment of about 7,500. By 1920, Toledo's population stood at 243,164 persons.

Similar to the Milburn Company, the Willys plant chose its site along the rail line leading to Detroit. This location in the northern arm of the 1892 annexation (Fig. 6) drew many workers to the vicinity. As a result in 1916 so-called "West Toledo" received its largest single addition.²

Through the last quarter of a century, acquisitions to the city have been entirely residential areas. In the early 1920's, the annexations of the "Up-river" districts extended to the Maumee corporate limits. Since then additions have been largely along the western border of Toledo in its north portion (Fig. 6).³ Among the factors influencing this present direction of expansion have been (1) efficient arterial highways, (2) lack of nearby industries, (3) poorer agricultural soils which have encouraged platting, (4) proximity to the major park system and the University of Toledo, and (5) perhaps a desire to be in the lo-

¹Census data for automobile factory employment is not given since this might divulge confidential information about individual plants. To get a relative measure of the increase in employment, the writer used the statistics for auto factory laborers and semi-skilled workers. The resulting figures were 1,011 in 1910 and 7,915 in 1920. In the latter year, this total accounted for 32.4 per cent of those similarly employed in Ohio (Fourteenth Census of the United States: 1920. Population, Vol. IV, pp. 227, 229).

In 1915, Willys produced 94,457 cars which placed the company second only to Ford in sales (E. D. Kennedy, The Automobile Industry [New York: Reynal & Hitchcock, 1941], pp. 66, 68).

²This annexation was 3.05 square miles. Measurement by the author using a polar planimeter.

³During the first nine months of 1946, the twenty-eight plats given final or preliminary approval were nearly all in this sector. The number granted final approval was twelve (603 lots), and those receiving preliminary sanction totaled sixteen (873 lots). Data from MS records of Toledo and Lucas County Plan Commissions.

cality of Toledo's wealthy adjoining village of Ottawa.

In the following section of this chapter, employment mirrors the relative position of the various functions in the recent years of the industrial era. Such innovations as motor carriers and airplanes as well as new industrial products have kept the primary functions dynamic.

Section 4. Employment in the Various Functions

The relative importance of the various functions of the Toledo area are reflected in the employment figures. These sources of livelihood evidence especially the significance of the primary functions--manufacturing, commerce or trade, and transportation--which together accounted for 72.7 per cent of the 99,209 gainfully employed in 1940 (Tables 3 and 4).¹ This total is 35.1 per cent of the total population (282,349) or 80.6 per cent of the labor force (123,092).² In the larger urban unit, the metropolitan district, 118,735 were employed out of a population of 341,663 (Table 4). The labor force for the metropolitan area numbered 145,813 in 1940.

A comparison of Toledo with a number of other major cities in the same geographical section of the United States is shown in Table 5. The percentages given prove helpful in seeing the similarities and differences which exist among the group. This in turn provides a better understanding of the gross character of Toledo's employment.

In the 1930's Toledo, like nearly every major city, had a decline in the number gainfully employed (Table 3). Of the cities

¹Except where otherwise stated, all material in this section is based on the Sixteenth Census of the United States: 1940. Population, Vols. II and III.

Since the total gainfully employed in Toledo is so near to 100,000, each 1,000 persons employed approximates 1 per cent of the total.

²The ethnic and racial composition of Toledo's employment is: native white--86.2 per cent, foreign-born white--10.3 per cent, and colored--3.5 per cent. About one-fourth of the foreign-born are Polish and one-fifth are German. In nearby Detroit and Cleveland, the native white employees form only 67 and 69 per cent of the total. The average for urban areas of Ohio is 83.1 per cent. Toledo is slightly below the average for male employment (71.9 per cent). The average for urban areas of Ohio and the East North Central States is 72.5 per cent. This figure suggests a balance of the light and heavy industries.

TABLE 3

A COMPARISON OF THE MAJOR GROUPS OF EMPLOYMENT
IN TOLEDO: 1930-1940

Activity	1940 ^a		1930 ^b		Change 1930-1940	
	Number	Per Cent of Total Employed	Number	Per Cent of Total Employed	Number	Per Cent
Manufacturing	35,671	36.0	49,025	38.5	-13,354	-27
Trade ^c	28,243	28.5	27,712	21.8	+ 531	+ 2
Transportation, Communication, and other Utilities	10,572	10.6	13,428	10.5	- 2,856	-21
Construction	3,993	4.0	8,535	6.7	- 4,542	-53
Personal Services	8,306	8.4	12,842	10.1	- 4,536	-35
Professional Services	8,226	8.3	7,892	6.2	+ 334	+ 4
Government	3,074	3.1	4,659	3.7	- 1,585	-34
Other Activities	1,124	1.1	3,182	2.5	- 2,058	-65
Total	99,209	100.0	127,275	100.0	-28,066	-22 ^d

^aSixteenth Census of the United States: 1940. Population, Vol. II, Part V, p. 735.

^bThe figures for 1930 were computed by combining the various activities under the same major headings as used in the 1940 Census (Fifteenth Census of the United States: 1930. Population, Vol. III, Part II, p. 515).

^cTrade includes retail and wholesale trade, finance, insurance, real estate, business and repair services, amusement, recreation, and related services.

^dPercentage of change in total employment from 1930 to 1940.

TABLE 4

EMPLOYMENT IN SELECTED ACTIVITIES FOR TOLEDO
AND THE METROPOLITAN DISTRICT IN 1940

Activity	Toledo ^a		Metropolitan District Outside Toledo ^b	
	Number	Per Cent of Total ^c	Number	Per Cent of Total ^c
<u>Manufacturing</u>	<u>35,671</u>	<u>36.0</u>	<u>7,363</u>	<u>37.7</u>
Automobiles and Equipment	8,818	(24.7)	1,463	(19.9)
Machinery	6,158	(17.3)	1,233	(16.7)
Metals and Prod- ucts (except machinery)	4,760	(13.6)	802	(10.9)
Glass and Prod- ucts	3,938	(11.0)	1,636 ^d	(22.2)
Food and Kindred Products	2,644	(7.4)	478	(6.5)
Textiles and Products	1,667	(4.7)	148	(2.0)
Petroleum Re- fining	1,454	(4.1)	411 ^d	(5.6)
Printing and Publishing	1,371	(3.8)	175	(2.4)
All other	4,861	(13.4)	1,017	(13.8)
<u>Transportation</u>	<u>8,132</u>	<u>8.2</u>	<u>1,121</u>	<u>5.7</u>
Railroads and Railway Express	5,357	(65.9)	712	(63.5)
Trucking Service	1,297	(15.9)	228	(20.3)
All other	1,478	(18.2)	181	(16.2)
<u>Communication and Utilities</u>	<u>2,440</u>	<u>2.4</u>	<u>396</u>	<u>2.0</u>
<u>Retail Trade</u>	<u>18,294</u>	<u>18.5</u>	<u>2,679</u>	<u>13.7</u>
<u>Wholesale Trade</u>	<u>3,704</u>	<u>3.7</u>	<u>630</u>	<u>3.2</u>
<u>Other Trade^e</u>	<u>6,245</u>	<u>6.3</u>	<u>1,073</u>	<u>5.5</u>
<u>Construction</u>	<u>3,993</u>	<u>4.0</u>	<u>960</u>	<u>4.9</u>
<u>Personal Services</u>	<u>8,306</u>	<u>8.4</u>	<u>1,633</u>	<u>8.4</u>

TABLE 4 - Continued

Activity	Toledo ^a		Metropolitan District Outside Toledo ^b	
	Number	Per Cent of Total ^c	Number	Per Cent of Total ^c
<u>Professional Services</u>	<u>8,226</u>	<u>8.3</u>	<u>1,392</u>	<u>7.1</u>
Educational	3,139	(38.2)	...	...
Medical and	3,118	(37.9)	...	...
Health	1,969	(23.9)	...	...
All other				
<u>Government</u>	<u>3,074</u>	<u>3.1</u>	<u>402</u>	<u>2.1</u>
<u>Other (Agricul- ture, Forestry, Mining, and not reported)</u>	<u>1,124</u>	<u>1.1</u>	<u>1,877</u>	<u>9.6</u>
Total	99,209	100.0	19,526	100.0

^aSixteenth Census of the United States: 1940. Population, Vol. III, Part IV, pp. 814-15.

^bObtained by subtracting the Toledo figures from those for the metropolitan district (Sixteenth Census of the United States: 1940. Population, Vol. II, Part V, p. 778).

^cPercentages underlined are portions of the total employed, whereas, the percentages in parentheses are portions of the major subdivisions.

^dObtained by allowing the same percentage to the total for "stone, clay, and glass products" or "petroleum and coal products" as was the case in Toledo.

^eOther Trade includes finance, insurance, real estate, business and repair services, amusement, recreation, and related services.

TABLE 5

PERCENTAGES ENGAGED IN MAJOR GROUPS OF EMPLOYMENT IN TOLEDO
AND EIGHT OTHER EAST NORTH CENTRAL CITIES IN 1940*

	To- ledo	Ak- ron	De- troit	Day- ton	Cleve- land	Fort Wayne	Chi- cago	Indi- anap- olis	Co- lum- bus
By Activities									
Manufacturing	36.0	48.3	47.2	44.8	40.5	37.0	34.1	29.1	24.0
Transporta- tion	8.2	4.1	3.6	2.5	5.8	7.3	7.3	6.8	8.2
Trade	28.5	23.9	25.4	24.5	27.2	29.3	32.0	31.4	30.7
Communication and Utili- ties	2.4	1.8	2.2	2.2	2.4	2.8	2.7	2.7	2.7
Construction	4.0	3.0	3.9	3.9	4.0	4.1	3.9	4.7	5.3
Personal Ser- vices	8.4	7.7	7.5	8.3	8.3	7.2	8.5	10.1	10.0
Professional Services	8.3	6.9	6.0	7.1	7.0	7.6	6.8	8.5	9.3
Government	3.1	2.6	3.1	4.7	3.4	2.6	3.5	4.5	7.3
Other	1.1	1.7	1.1	2.0	1.4	2.1	1.2	2.2	2.5
By Occupations									
Professional and Semi- professional	8.7	8.1	7.4	8.2	6.8	8.8	7.7	8.7	9.1
Proprietors, Managers and Officials	9.7	8.0	7.4	7.4	6.8	9.4	8.2	9.3	9.6
Clerical, Sales, etc.	23.3	21.1	21.7	21.7	21.8	25.1	27.5	26.1	26.4
Craftsmen, Foremen, etc.	16.0	14.0	17.5	17.2	17.0	15.1	14.2	14.3	14.5
Operatives, etc.	22.8	29.6	26.8	26.4	25.6	25.0	22.0	19.2	18.8
Laborers	5.9	5.8	6.3	4.4	8.1	4.7	6.5	6.7	4.9
Service Workers	13.0	12.3	12.4	13.5	13.5	10.8	13.5	14.8	15.6
Not reported	0.5	1.1	0.5	1.2	0.4	1.1	0.4	0.9	1.1

*Sixteenth Census of the United States: 1940. Population, Vol. II, Parts II, III, and V, passim.

considered in Table 5, however, only Akron had such a marked relative decrease (22 per cent). As in most cities, the greatest loss was in manufacturing. In Toledo, it accounted for 48 per cent of the total decline. Transportation and communication and other utilities were responsible for another 10 per cent of the reduction in employment. Transportation, however, only accounted for a third of this. Trade was the only primary function to make a gain through the decade. Among the other major groups of employment, construction and personal services each lost about 4,500 or 16 per cent of the total decline. Thus the diminished employment had harsh effects upon the city, but it has resulted in a better balance among the primary functions.

As the method of compiling the Census data on employment has changed somewhat from 1930 to 1940, the statistics are not easily comparable. As a consequence, in Table 5 percentages are given both by activity and occupation.¹

Toledo, like all major American cities, has felt the influence of the war on her industrial activities. However, the pressure and effects have not been so marked as in many other cities.² Thus the Census data plus some estimates and interpretation give a valid picture of Toledo today as well as an excellent sample of the cities of northeastern United States.

Most communities in the industrial Northeast have their greatest employment in manufacturing. Toledo is no exception. However, the 36 per cent directly employed in this activity falls far below many industrial cities, and also the diversity within manufacturing broadens this base. The percentage employed in manufacturing in the urban areas of Ohio is 38.4.³ Toledo's larg-

¹The term "activity" is used here in lieu of "industry," since the latter easily might suggest only manufacturing rather than all sources of livelihood. In 1940, "clerical" was distributed through the various activities rather than being segregated as in 1930. Therefore, actually more weight is placed on each activity in 1940.

²A series of studies by the Bureau of Labor Statistics entitled, "Impact of the War" and concerning various industrial areas has not included the Toledo area. This suggests that Toledo was not considered as being affected critically by the war.

³Sixteenth Census of the United States: 1940. Population, Vol. II, Part V, p. 564.

In a study which included 57 cities of 100,000 to 300,000 persons, the percentage employed in manufacturing in this group

est manufacturing concentration is in automobiles and automobile equipment with 25 per cent thus engaged (Table 4). In comparison, Detroit has 64 per cent of the persons in manufacturing in this activity, and Akron has 74 per cent in the manufacture of rubber products.

Of the 35,671 in manufacturing in 1940, 25,673 were classified as craftsmen, foremen, operatives, and laborers. This was 58 per cent of the total (44,378) in these occupations.¹

Trade accounts for the second largest activity group, providing for an employment of over 28,000. Much of this employment is of a secondary nature, since it is dependent upon such primary functions as manufacturing for its continuance.² Nevertheless, Toledo had 3.7 per cent in wholesale trade. Chicago and Indianapolis, with 4.0 and 3.9 per cent respectively, were the only cities of the group considered in Table 5 which were higher. The total percentage of 22.2 for retail and wholesale trade is 2.1 per cent above the average for urban areas of Ohio.

As transportation utilized over 8,000 or 8.2 per cent of the employed population of Toledo in 1940, this activity is placed third among the primary functions. Approximately 6,000 derive their income from inter-state commerce and thus provide another basic factor for the support of the city. The percentage employed in transportation is greater than in most cities of major size.³

was 38 per cent. For data on this and other employment groups see William F. Ogburn, Social Characteristics of Cities (Chicago: The International City Managers' Association, 1937), chap. xi.

¹See chap. iv, sec. 1, for an additional consideration of manufactural employment.

²Hoyt has devised a method of weighting the primary sources of employment. He estimates that one person is required in the various services--retail trade, professional, personal, and public--for every individual in a fundamental basic activity. Non-local trade and finance is then the residual of 100 after the percentages in basic employment have been doubled and subtracted from this figure. This procedure was used to ascertain the proportion which various activities contributed to the support of a number of cities examined. Toledo was not included in the group. See Homer Hoyt, "Economic Background of Cities," The Jour. of Land and Public Utility Econ., XVII (May, 1941), 190.

³The railroads employ 5,258 persons in Toledo in comparison to 4,623 in Cincinnati and 5,263 in Indianapolis, both major rail centers. Taken from Sixteenth Census of the United States:

Other employment activities do not show the variation from the average which one finds in the primary functions (Table 5). Some variations, nevertheless, are worthy of note.

Professional services employ 8.3 per cent of the gainfully employed. This places Toledo high among the cities in Table 5. For a student enrollment of 43,795, there are 1,417 teachers.¹ In Toledo, as in many major cities, members of the professions frequently live in the suburbs.²

Lacking major non-local governmental functions, Toledo has not been aided significantly from this type of employment. The Ohio urban average for this activity is 3.4 per cent while in Toledo it is 3.1. In 1940, the municipality employed 2,333 persons other than teachers.³

In the other activity groups--domestic and personal services, construction, and communication and utilities--Toledo percentages of 8.4, 4.0, and 2.4 respectively are similar to the Ohio urban figures of 8.6, 4.2, and 2.4. Here again are sources of livelihood largely dependent upon the primary functions of Toledo.

A total of 18.4 per cent for the first two occupation groups (Professional and Semi-professional and Proprietors, Managers and Officials) listed in the lower part of Table 5 places Toledo second among the nine cities considered. Due to the ability and income of these groups, a high figure is a significant

1940. Population, Vol. III, Part II, p. 1015; Part IV, pp. 762, 766.

Among smaller towns, the establishment of a railway division point frequently makes the percentage much higher than that of Toledo. For an example see Robert L. Wrigley, Jr., The Occupational Structure of Pocatello, Idaho (Ph. D. dissertation, Dept. of Geography, University of Chicago [Chicago: Private edition, Distributed by the University of Chicago Libraries, 1942]), p. 9. In Pocatello (18,133 inhabitants), about 36.5 per cent of the gainful workers found employment in transportation activities.

¹U. S. Bureau of the Census, Statistical Abstract of the United States, Cities Supplement (Washington: Government Printing Office, 1944), p. 14.

²Cf. Ogburn, op. cit., p. 8.

³International City Managers' Association, The Municipal Year Book, 1940, ed. by C. E. Ridley and O. F. Nolting (Chicago: The International City Managers' Association, 1940), p. 114.

factor in the general desirability of any city.¹

In 1940, a total of 23,883 were seeking jobs or were in public emergency work. Although the world-wide depression of the 1930's provided the basic cause for unemployment, other forces accentuated the situation. Important factors were the unbalanced dependence upon one large automobile plant and the labor-management difficulties. The one plant making finished motor cars reduced its employment by about 18,000 persons in 1929.² Broadening the base for employment is recognized as the major safeguard from this problem. The community's interest and activity in bringing about a diversity of industries, products, and markets is a solution. The labor-management relations in Toledo received such widespread publicity largely because they occurred so early in the period of labor unrest. Organization of an Industrial Peace Board was one answer to this problem.³

Seasonal fluctuation in business activity has little effect upon local employment. The indexes for the highest and lowest months are April, 106.3 and August, 92.8. When any fluctuation occurs, it is partially offset by counteracting changes in other industries.⁴

In 1944, the labor force of the metropolitan district was estimated at 150,000.⁵ This was over 4,000 more than the

¹In a "general goodness" scoring, Toledo rated 735 or above all the cities except Ft. Wayne, which has less than one-half the population of Toledo. See E. L. Thorndike, Your City (New York: Harcourt, Brace & Co., Inc., 1939), p. 33.

²Data from MS records in files of the Industrial Department of the Toledo Chamber of Commerce.

³"How One City's Industry is Helping America," Factory Management and Maintenance, XCVIII (August, 1940), F2. The theme of the entire issue of this publication is "What Industry Can Do for America." Toledo was chosen as representative of the efforts of a typical American industrial city.

A Labor-Management Committee now serves in a position similar to that formerly held by the Industrial Peace Board. Its procedure, known as the "Toledo Plan," has received national recognition and interest.

⁴C. K. Searles, F. G. Moore, and A. Theodorides, Seasonal Fluctuations in Toledo Business, Univ. of Toledo Bur. of Bus. Res. Bull. No. 12 (Toledo: University of Toledo, 1939), pp. 4, 12. (Mimeographed.)

⁵"Jobs for All," Toledo Business, XXII (May, 1944), 4. The estimates for the metropolitan district are used for several

figure for the 1940 Census, although the armed forces had taken about 32,000 Toledoans. The estimates for the various activities were: 90,000 in manufacturing; 20,000 in wholesale and retail trade; 15,000 in transportation, communications, and public utilities; 6,000 in professional services; 5,000 in government; 1,000 in construction; 12,000 in other private employment (personal services, other trade, etc.); and 1,000 seeking work. The most significant changes were the increase of over 100 per cent in manufacturing, a four-fifths decrease in construction employment, a probable increase of about 30 per cent in transportation, and the virtual elimination of relief workers and unemployment. In the primary functions of the metropolitan district, this meant a rise in employment from about 85,000 to an estimated 128,000.¹ The percentage of employment in primary functions increased from 71 per cent to 85 per cent.

The figures which have been presented are sufficient to show the general character of Toledo's employment. The distribution among the primary functions appeared better than average at the outset of the war. Depletion of the local resources is not a factor in the future employment of Toledo. Instead a continued emphasis on diversification of industry and a more complete utilization of the city's splendid position and facilities for extending the trade area are important problems. Both trade and transportation can benefit from the latter development. Employment in the other activities is largely a reflection of those in the primary fields. As manufacturing accounts for the largest and most variable employment group in Toledo, an analysis of this source of livelihood is given additional consideration in Section 1 of Chapter IV.

reasons (1) no similar data are available for the city proper, (2) in 1940 Toledo provided five-sixths of the metropolitan district employment and thus the estimates chiefly reflect the city's employment, (3) recent industrial building on the borders of the city are making the metropolitan district increasingly an integral part of the city.

¹In 1940, there were 84,912 employed in manufacturing, transportation and trade as classified in Table 4. The 1944 total of 127,850 was obtained by using the Chamber of Commerce figures for manufacturing, retail, and wholesale trade and by estimating the relative changes in transportation and other trade.

CHAPTER II

TRANSPORTATIONAL FUNCTIONS

Cities have been called "creatures of transportation."¹ In Toledo each of the country's successive inland transportation developments have contributed to this "creature" born of traffic. Two of the facilities, canals and electric interurbans, have had their functions superseded by competing modes of transport. The present services--rail, motor, water, air, and pipe line carriers--each afford a unique function and probably, with some adjustments, all will continue. Few cities in the world have had such a variety of forms of transportation developed to such a degree of importance as has Toledo.

The development of the transportation facilities and functions of Toledo serves as a barometer of the evolutionary changes in transportation in the Middle West and the nation. In harmony with its position at the head of Lake Erie where it competes for business in the Central Lowland and in the American Manufacturing Belt, Toledo has embraced and profited from each means of transportation as it has appeared in the nation's economy. Thus Toledo's strategic position has been capitalized by an interrelated series of transportation adjustments.²

Early recognition of Toledo's site as a strategic location for commerce brought lake carriers, the canals, and the railways. These facilities, in turn, provided the original impetus in Toledo's growth, and ensuing means of transport have helped in the city's development. Air transportation, the latest link in the chain, lies largely in the future, but already Toledo shows

¹Ogburn, op. cit., p. 32.

²Toledo's position is a local expression of the contention that "... many areas have proved to be so placed in the world's pattern that the assets of position are as valuable or even more valuable than the local resources." See Charles C. Colby, "The Geographical Problem," New Perspectives on Peace, ed. G. B. de Huszar (Chicago: University of Chicago Press, 1944), p. 30.

signs of active participation in the "air age."

Cognizance on the part of writers of transportation advantages as a key to Toledo's prosperity is reflected in the claims of "world's largest soft coal port" and "America's third largest rail center." Although both of these boasts are somewhat incorrect, as is shown in later places in this chapter, such contentions have point if only to bring out the importance given to transportation as a fundamental factor in Toledo's growth. The transportation activities provide employment for a considerable number of persons in Toledo (8,132 in 1940) and contribute in other less obvious ways to the city's economy.

The value of Lake Erie already has been mentioned (chap. 1). It contributes in several ways to Toledo as a transportation focus. Lake transport led to the settlement and early development of Toledo. It also encouraged the construction of canals to connect the head of the lake and the Maumee River with the Ohio Valley. It split railway transport which funnels through the Mohawk corridor into two routes, one north and one south of the lake.¹ Toledo lies on the south shore route and on the short but important link between the two routes at the western end of the lake. The head of Lake Erie, moreover, is the hub of a three-quarter wheel of transportation lines. The spokes of the wheel lead from Toledo to its rich trading territory. The head of Lake Erie also lies far enough west and south to give Toledo command of the northward moving coal from the rich Middle Appalachian fields and of the eastward moving crude oil and petroleum products.

Toledo participates in and profits from five transportation categories (see Fig. 8). It is a way point on major national lines or routes such as the New York Central, or U. S. highway routes 20 and 25. It is a zone of transfer from one major route to another route. It is a breaking point for important rail-lake commodity flows. It is the focal point in a regional transportation and trading wheel. It has an effective local and vicinal pattern of streets and highways. Each of these in turn and all of them together contribute to the value of Toledo's other primary

¹Earlier routes into the lower lakes region had followed the circuitous track via the Ottawa River and the upper lakes and later across the Appalachians into the Ohio Valley and then northward.

functions, commerce and manufacturing.¹

In some ways, Toledo's transportation functions take on an industrial quality. This is shown clearly in the repair shops and roundhouses of the many railroads. The freight and passenger stations, the belt line railroad, the freight classification yards, the wharves, the coal docks, the petroleum terminals, the truck and bus terminals, and the airports not only contribute to employment but help to make the city industrially-minded. In addition, all of these buildings and other forms have a marked effect upon the structure of the city and the metropolitan area.

Of the total transportation employment in the city (8,132), approximately three-fourths are engaged in activities having a regional interest. These figures are high in comparison with their relative weight in other cities. In the total employment of Toledo, however, transportation accounts for only 8.2 per cent (Table 4). Other activities, especially manufacturing, dominate the employment picture and, therefore, the number engaged alone is no true measure of the contribution of the transportation function to Toledo nor of the city's part in the regional scene. To understand the rôle played by this primary function, the major activities of each transport facility need to be investigated.

Section 1. Earlier Contributing Facilities

Although canals and electric interurbans no longer serve Toledo, they contributed much to the city's growth. The canals, which gave the city its first commercial potency, initiated the bulk traffic of the Toledo port. The interurban lines greatly facilitated the development of a substantial wholesale and retail trade area in the pre-highway period and enhanced the influence of the city in its tributary area.

Canals

"No matter how valuable the railroads . . . it is still

¹It is generally agreed that transportation exerts a dominant influence on manufacturing. The relative importance varies with the kind of industry and whether the situation of materials or markets is being considered. A good concise treatment of the subject is U. S. National Resources Planning Board, Industrial Location and National Resources, December, 1942 (Washington: Government Printing Office, 1943), chap. ix. Alfred Weber considers transportation factors above all others. See Alfred Weber, Theory

true that the canals had prepared the way, settled the country [the Maumee Valley], and laid the foundation of its cities."¹ The clamor for canals to connect the Great Lakes to the Mississippi River basin was stimulated by the success of the Erie Canal in New York (1825). Opening of the Ohio and Erie Canal (1832) and its effects upon Cleveland spurred on the demand.²

The obvious geographical advantages of Toledo, at the mouth of the broad and navigable lower Maumee, attracted attention to this point as a lake terminus for any canals that were to tap the resources of western Ohio and eastern Indiana.

Earlier the Indians had found the Maumee Valley basin of northwestern Ohio to be strategic because of the river. By following this stream to its source and portaging a few miles near Ft. Wayne, they were able to reach the headwaters of the Wabash River and thence the Ohio and Mississippi, or by following up the Auglaize, a tributary of the Maumee, and portaging to the Miami River, they came to the Ohio near Cincinnati.³

Surveys of the routes of the Wabash and Erie and the Miami and Erie canals were made in 1824, but through traffic did not begin until 1843 and 1845 respectively.⁴ The two canals intersected a short distance south of Defiance, Ohio and were one and the same

of the Location of Industry, trans. Carl J. Friedrich (Chicago: University of Chicago Press, 1929).

¹H. S. Knapp, History of the Maumee Valley (Toledo: Blade Printing and Publishing House, 1872), p. 329.

²This canal connected Portsmouth with Cleveland. For an account of the rise and decline of Ohio canals see Chester E. Finn, "The Ohio Canals: Public Enterprise on the Frontier," The Ohio Archaeological and Historical Quarterly, LI (January-March, 1942), 1-40.

³Previous to United States jurisdiction in 1783, the Maumee-Wabash trough had been one of the most important portage routes between the two major drainage basins of interior United States. The initial use of this route by the white man may be established as about 1699 when D'Iberville led his colonists from Quebec to Louisiana along it. Thereafter, it was a link in the main line of communications which held together the French possessions in America. See Dryer, op. cit., pp. 46-47.

⁴An important factor in this long delay was the Ohio-Michigan boundary dispute. See n. 2, p. 22.

The building of the canals encouraged a large increase in the Irish settlement of the city. This immigrant group provided much of the manpower for the construction of all of the North's canals.

from there to Toledo, a distance of approximately 65 miles (Fig. 9). With their completion, Toledo was linked with Lafayette, Indiana (242 miles) and points on the lower Wabash River and with Cincinnati (301 miles) on the Ohio River, furnishing water routes over practically the same ground that the Indians had traveled by canoe and portage.

Originally there were three outlets from the canal into the Maumee River.¹ However, only the one terminating at Swan Creek (Fig. 20) near the Central Business District was desirably located and thus was long or extensively used. Hence this man-made waterway, which directed much of the early flow of Maumee Valley trade, routed the traffic through Toledo. The value of the original site of the city again was proven.

The active era of clearing the land and developing the great potential agricultural wealth of the Maumee Valley Basin followed the completion of the canals.² In turn, the canals greatly extended the commercial hinterland of the growing port of Toledo into the rich agricultural lands of the Wabash and Miami valleys to the south and west. For about thirty years, these waterways remained the great controlling factor in the increasing commerce, manufacturing, and population of the city.³

A comparison of the receipts of wheat, flour, and corn at Toledo shortly before and after the opening of the canals, at their peak traffic and in their waning days, is shown in Table 6. This indicates the period in which the canal was an important influence in the commerce of Toledo.⁴ The city's rise to promi-

¹The other termini, at Maumee, Ohio and near the mouth of the river, were abandoned in the 1860's. See Charles E. Slocum, History of the Maumee Valley Basin (Defiance, Ohio: C. E. Slocum, 1905), p. 610.

The route to the mouth of the river (the Manhattan Extension) bisected the present Central Business District, following the low-lying land which once had marked the lower course of Swan Creek and in historic times had been a marshland.

²See p. 154 for further mention of this development.

³The old packet dock on Swan Creek near Washington Street was the busiest place in northwestern Ohio with sometimes 50 to 60 canal boats loading and unloading (Toledo Blade, January 12, 1906).

⁴In 1851, Toledo contributed 22 per cent of the wheat, 19 per cent of the flour, and 32 per cent of the corn which Buffalo received from all western lake ports. See Elbert Benton, "The

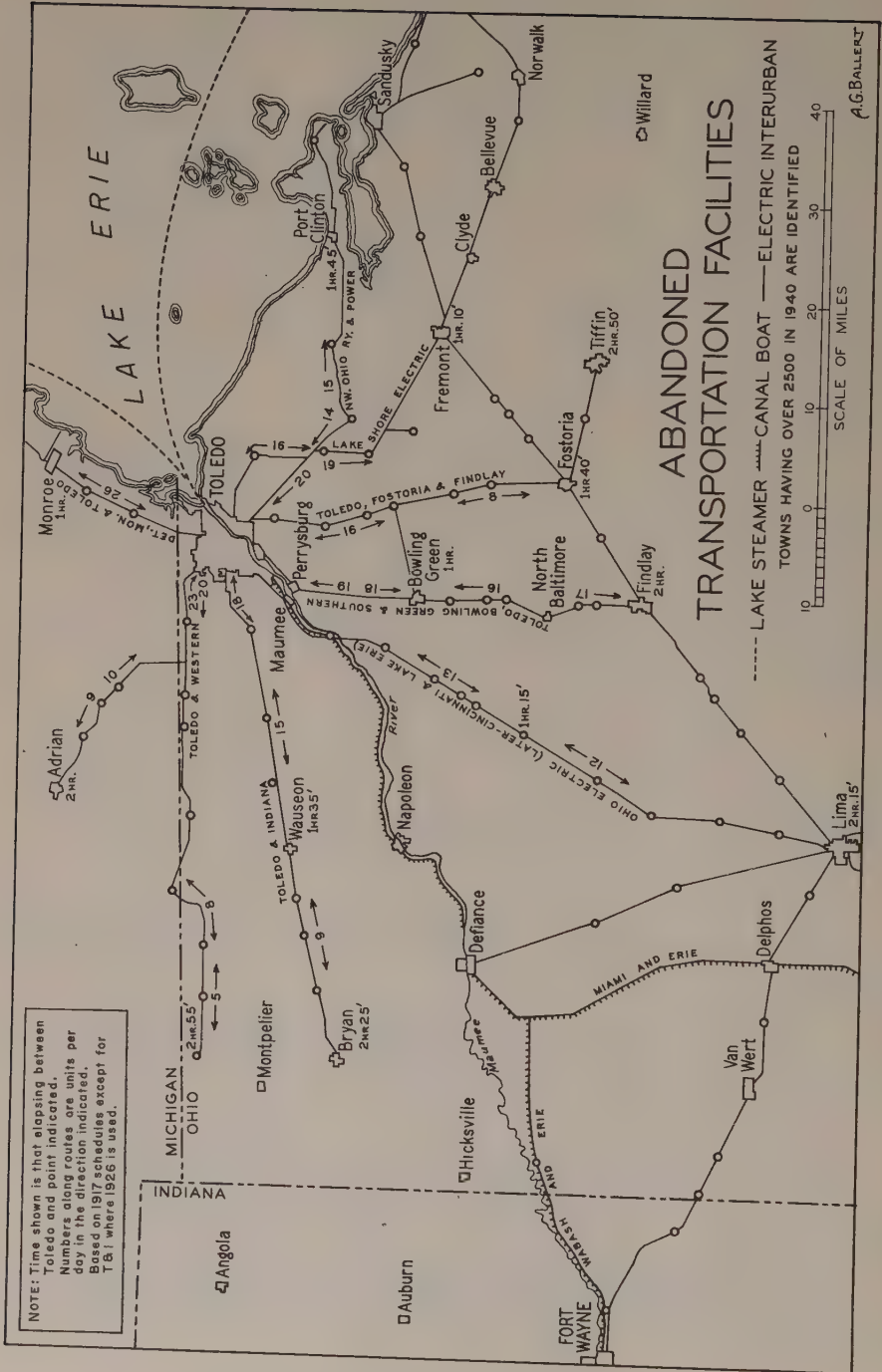


Figure 6

nence as a wheat center dates from this time.

TABLE 6

CANAL RECEIPTS OF MAJOR COMMODITIES AT TOLEDO
FOR FOUR SELECTED YEARS*

Year	Wheat (bu.)	Flour (bbl.)	Corn (bu.)
1842	116,730	37,280	.....
1846	810,963	164,689	1,159,315
Peak	1,954,718 (1852)	260,898 (1852)	4,067,676 (1854)
1881	723,282	9,234	252,280

*Figures for 1842 and 1846 from Israel D. Andrews, Report on the Trade and Commerce of the British North American Colonies and upon the Trade of the Great Lakes and Rivers (Washington: Senate Printer, 1854), p. 56. Peak years from C. C. Huntington and C. P. McClelland, History of the Ohio Canals: Their Construction, Cost, Use, and Partial Abandonment (Columbus: Ohio State Archaeological and Historical Society, 1905), p. 179. Figures for 1881 from Manufacturing and Mercantile Resources of Toledo, op. cit., p. 703.

In the middle 1800's, Toledo had nearly every transport advantage which could accrue to a middle western city at that time. Industries of Ohio in 1840-60 were along Lake Erie, the Ohio River and the canals.¹ Therefore, as a lake port for two canal routes, the city might be said to have benefited three-fold. Moreover, by this time six rail routes radiated from the city.

Canals came into full use as the cheapest, easiest, and safest mode of transportation devised up to this time. The immediate effect which they had upon prices of products bought and sold in the interior further stimulated the traffic. There was on the one hand an advance in bulk commodity prices and on the

Wabash Trade Route in the Development of the Old Northwest," Johns Hopkins University Studies in Historical and Political Science, XXI, Nos. 1-2 (1903), 103.

¹Geological Survey of Ohio, Geography of Ohio, by Roderick Peattie, Fourth Series, Bull. No. 27 (Columbus: Geological Survey of Ohio, 1923), p. 101.

Toledo, unlike Cleveland, was not served by canals which passed through the coal fields of the southeastern part of the state. However, the canal water aided industry by providing power for saw mills and grist mills along its route.

other a reduction in the cost of eastern products.¹ Such a condition accelerated settlement and thereby promoted the growth of Toledo.

Use of the canal to Toledo continued until the start of the twentieth century, but its major value to the city's population and commercial growth long had passed.² As the commercial interests initiated by the canals grew stronger, they demanded better facilities.³ Grain and the other more valuable freight were the first to change to the more flexible service provided by the railroads.⁴

The canal long has been dead and buried.⁵ Surveys and plans, however, still are being entertained for a waterway to connect Lake Erie at Toledo with Lake Michigan⁶ and with the Ohio

¹By lowering the Erie Canal toll, traffic from New York to southern Ohio and Indiana was changed from a route via New Orleans and the rivers to one by way of the canals and Lake Erie. See Benton, op. cit., p. 105.

²The Indiana portion of the Wabash and Erie Canal was abandoned in 1874 (Ibid., p. 87).

³Among the physical factors leading to the decline of the canals were periods of shallow water and broken embankments. Also the season of navigation was less than eight months (average from 1846-1858). See ibid., p. 77. In 1861, the state canals were leased for 17 years to private parties. They were returned to the State in poor condition (U. S. Congress, House, Survey of the Miami and Erie Canal, the Ohio Canal, etc., House Doc. No. 278, 54th Cong., 1st Sess. [Washington: Government Printing Office, 1896], p. 8). In addition, the canals ran north and south while the routes of trade were now east and west. See Ernest L. Bogart, "Early Canal Traffic and Railroad Competition in Ohio," Journal of Political Economy, XXI (January, 1913), 68.

The most prosperous year of the Wabash and Erie Canal was 1852. The Wabash Railroad, opening four years later, touched every important town along this canal.

In a day in August, 1856, the Wabash Railroad carried 100 carloads of farm produce to Toledo (Lafayette Daily American, August 23, 1856, quoted in Benton, op. cit., p. 80).

⁴In 1860, over 4,000,000 of the 7,000,000 bushels of wheat received at Toledo were carried by railroad (Hannah L. Kerlin, "The History of the Railroads Which Entered Toledo Before the Civil War" [Unpublished Master's thesis, Dept. of History, Ohio State University, 1937], p. 38).

⁵The Miami and Erie Canal was closed officially in 1929. During the early 1930's, the Toledo-Maumee portion was filled in and provided the site for the present Anthony Wayne Trail, a broad limited-access highway.

⁶An organization known as the "Toledo, Fort Wayne and

River.¹ The possibilities of bulk shipment to Toledo from Lake Michigan appear to be restricted to glass sand, wheat, petroleum products, and perhaps some steel. On the Ohio-Cincinnati waterway, the Corps of Engineers gives the potential traffic as iron ore, iron and steel, and coal but estimates the yearly volume as only 375,000 tons.² Evaluated on any economic basis, both projects appear to be unsound.

The direct effects of the canal on Toledo long have ceased, and only the remnants of a few locks remain. However, the line of the canal right-of-way continues as a force in the activities of the city. It furnished an express highway route (Anthony Wayne Trail) to the Commercial Zone for residents of the southern part of the city and up-river suburbs. Also it provided the site for a railroad right-of-way to the heart of the Wholesale-Terminal District (Fig. 20). In addition, the municipality fell heir to some valuable portions of the canal right-of-way in the Central Business District. Public ownership of this strategic property may affect sharply the future land use here.

Electric Interurbans

During the first quarter of the twentieth century, Toledo received much aid in her growth as a commercial center from the interurban railways. The rise of this form of transportation was rapid, and the decline was just as abrupt.³

Interurban railways, as their name implies, connected Toledo with the communities in its regional area. Although such

Chicago Deep Waterway Association" was organized in 1907. In 1912, Congress authorized a preliminary survey of several alternative routes. The report of the Corps of Engineers in 1918 was unfavorable to the project. See Dryer, op. cit., p. 48.

¹Two of numerous surveys which Congress has requested on this subject are: U. S. Congress, House, Canal Connecting Lake Erie with Ohio River, House Doc. No. 188, 67th Cong., 2d Sess. (Washington: Government Printing Office, 1922) and U. S. Congress, House, Lake Erie and Ohio River Canal, House Doc. No. 178, 76th Cong., 1st Sess. (Washington: Government Printing Office, 1939).

²See second source in previous footnote.

³After World War I, the automobile and the motor truck cut deeply into both the passenger and commodity traffic. In 1916, there were 2,869 miles of interurban line in Ohio. In 1940, only 164 miles remained. See Lindley et al., op. cit., p. 138.

major centers as Detroit, Cleveland, and Cincinnati could be reached by this means of transportation, its principal function was to link the towns and villages of the surrounding countryside with Toledo, the principal trade center. Terminal towns for routes from Toledo (reading counter-clockwise from north in Fig. 9) were Adrian, Pioneer (near Ohio-Michigan line), Bryan, Findlay, Tiffin, and Port Clinton. All of these towns lie in the borderland of the present retail trade area of Toledo (Figs. 21 and 22). Hence the city has benefited from a broad extraurban retail trade since shortly after the turn of the century.¹ Although some freight was carried on the electric cars, the major benefits were from the customers transported to the city and merchandise expressed to towns along the line. These services brought a substantial increase in the retail and wholesale activities of Toledo and aided in consolidating the trade area.

The nine lines radiating from Toledo (Fig. 9) were sufficient to place the city second only to Indianapolis as an interurban center. It was the inclusion of these electric railways with steam railroads which provided the basis for Toledo's claim to being the third largest rail center in the United States.²

The city's first interurban line, built by the Toledo and Maumee Valley Railway Company in 1894, provided a belt line to connect Toledo with up-river Maumee and Perrysburg. This was followed by service to Bowling Green in 1896.³ By 1902, five additional spokes extended from the Toledo hub.⁴ At the peak of interurban development in Ohio (1917), nine routes extended into

¹The only major sectors of Toledo unland not provided with interurban service were the middle Maumee Valley (Napoleon-Defiance area) and the portion of Michigan lying between Adrian and Monroe (Fig. 9). An electric line was built in the latter area, but it was never placed in service. It provided a route for the Detroit, Toledo and Ironton Railroad.

²L. G. Macomber, "Reasons Why Toledo Is the Third Transportation Center," Chamber of Commerce Journal, February, 1925, p. 8. See n. 1, p. 54 for additional mention.

³Street Railway Review, VIII (November, 1898), 784.
For a detailed record of the interurban railways of northwest Ohio see Joseph A. Galloway, Interurban Trails, Toledo, 1945. (Mimeographed.)

⁴U. S. Bureau of the Census, Street and Electric Railways, 1902 (Washington: Government Printing Office, 1905), p. 294 and map of Ohio electric railways, facing p. 102.

the hinterland of Toledo in addition to the forementioned belt line (Fig. 9). Over the nine routes about 150 scheduled units per day entered the city.¹

Some interurban lines (ex. Toledo and Indiana Railroad) paralleled the steam railroads and others were in the vicinity of them. This did not mean necessarily a duplication of service or a division of the traffic, for the interurban tapped and stimulated a new field by stopping at every road crossing at frequent intervals. Towns, hamlets, and isolated farmsteads which had been a full day's journey from Toledo by country road now were brought within an hour or two of the city.

Two features of the present transportation complex developed from the interurban services, namely the locations of the truck terminals and the routes of the bus lines. In the case of the former, the distribution of interurban freight houses has carried over to the present. Most of these houses were located in the Wholesale-Terminal District (Fig. 20). The advantage of proximity to express service drew many additional jobbers and wholesalers into the district. When the electric lines suspended their operations, the freight houses remained. Nearly all of these remnant structures now are used by trucking lines for much the same purpose as they served in the interurban days.² In addition, the electric railways set the general pattern for the interurban bus routes. Most of the towns along the former lines now are served by motor busses following similar routes. In several cases, the companies have continued and merely have changed their medium of transportation.³

¹The number of units and the time elapsing from Toledo to the points indicated in Fig. 9 are based on data from Central Electric Railfans' Association, Time Tables of Electric Railways, 1917, Bull. No. 59 (January, 1945).

²The passing of the interurban passenger station (at Jackson and Superior streets) resulted in an economic decline in this portion of the Central Business District.

³Examples of this transition are the Cincinnati and Lake Erie and Lake Shore Electric railways which transferred their services to busses in 1937 and 1938 respectively (Toledo News-Bee, November 20, 1937 and Toledo Blade, May 14, 1938).

The last regular interurban passenger service to Toledo was the Toledo and Indiana Railroad. This schedule was discontinued in 1939. The Toledo and Eastern (formerly the Ohio Public Service and earlier the Northwestern Ohio Railway and Power Company) still hauls some freight to Toledo although only about 12 miles of line remain.

Section 2. Railroads

From the standpoint of number of persons engaged as well as in volume of traffic, rail transportation is the outstanding transport function in Toledo.¹ Of the 8,132 persons in transportation in 1940, 5,258 were employed by the railroads. Approximately 700 more are employed similarly in the metropolitan district.²

Toledo is located near the northern border of the great railway web of the United States, which extends from Chicago and St. Louis on the west to Baltimore, Philadelphia, New York, and Boston on the east, and the city has direct rail connections with all of these important trade centers (Fig. 2). The lines of this area, known as the trunk line district, transport more than half the passengers and more than half the freight tonnage handled by American railroads.³ The general pattern of the major trunk lines in this most closely-spaced quarter of the country is one of east-west routes intersected by numerous, but on the whole less impor-

¹As previously mentioned (p. 52, n. 2), Toledoans long have called their city the third ranking railway center in the United States. This statement arose from a survey in which all rail common carriers were considered. At the time (1925), Toledo was listed as having the following: 14 steam, 3 switching, and 9 interurban railways. The decline of the interurbans and the consolidation of several steam railroads has reduced greatly the total facilities. Nevertheless, it appears that at present only Chicago, St. Louis, and Kansas City surpass Toledo in the number of rail lines. It must be remembered, however, that one railroad serving Toledo (the New York Central) has routes branching out in seven directions from the city. Based on a survey by the writer of major American cities using The Official Guide of the Railways and Steam Navigation Lines of the United States, Porto Rico, Canada, Mexico, and Cuba (New York: National Railway Publication Co., Monthly).

If comparative terminal figures were available for tonnage, number of trains operated in and out, number of passengers, or value of property, these, perhaps, would prove to be better measures of the relative importance of a rail terminal.

²Based on the same ratio to the total employed by the railroads and railway express as in the city.

Mr. Harry Tefft, Toledo representative of the Association of American Railroads, suggests a figure of 10,000 would be a better approximation of the number of railway employees in the Toledo area.

³Of. Stuart Daggett, Principals of Inland Transportation (New York: Harper & Bros., 1941), pp. 178-80.

The trunk line district is approximately the same area

tant, north-south lines (Fig. 10).

Of the five major east-west railroads, only the main line of the New York Central passes through Toledo. However, between the southern shore of Lake Erie and Lima (about 65 miles south of Toledo) pass the main east-west lines of the Pennsylvania, Baltimore and Ohio, Nickel Plate, and Erie railroads. Aided by its gateway position to industrial southeastern Michigan, Toledo has branch lines from all these east-west railroads except the Erie (see inset in Fig. 10). In addition, five north-south railroads have their termini at Toledo. The Michigan railroads which end here are the Ann Arbor, the Pere Marquette, and the Detroit and Toledo Shore Line, while the roads from the south and southeast which terminate in Toledo are the Chesapeake and Ohio and the Wheeling and Lake Erie. Also it should be noted that five branch lines of the New York Central converge at Toledo.

Regional Function

Toledo's situation at the northern border of the fore-mentioned pattern, with a water barrier extending 250 miles eastward, gives rise to the city's function as a rail terminal. In this capacity, Toledo is an important key in the American railroad transportation system. This results from the city's central position with respect to a number of manufacturing districts (Fig. 2). As the routes between many of these industrial centers pass through Toledo and as a number of railroads terminate here, a heavy transfer of cars is required at this point in order that freight can reach its destination.¹ The routes of the trunk line district and those of the Michigan peninsula meet at Toledo, and only the New York Central and the Pennsylvania railroads of the former group continue northward through this gateway to Michigan. The sole Michigan line to extend southward beyond Toledo is the Detroit, Toledo and Ironton which by-passes to the west of the city.²

as the Manufacturing Belt (Fig. 2) with the southern peninsula of Michigan excluded.

¹A comparison made by the author of the first-class rates by rail between 10 major cities in the interior portion of the manufacturing belt shows Toledo to be most advantageously located for low rates.

²This is the most recent railroad to serve Toledo (1916).

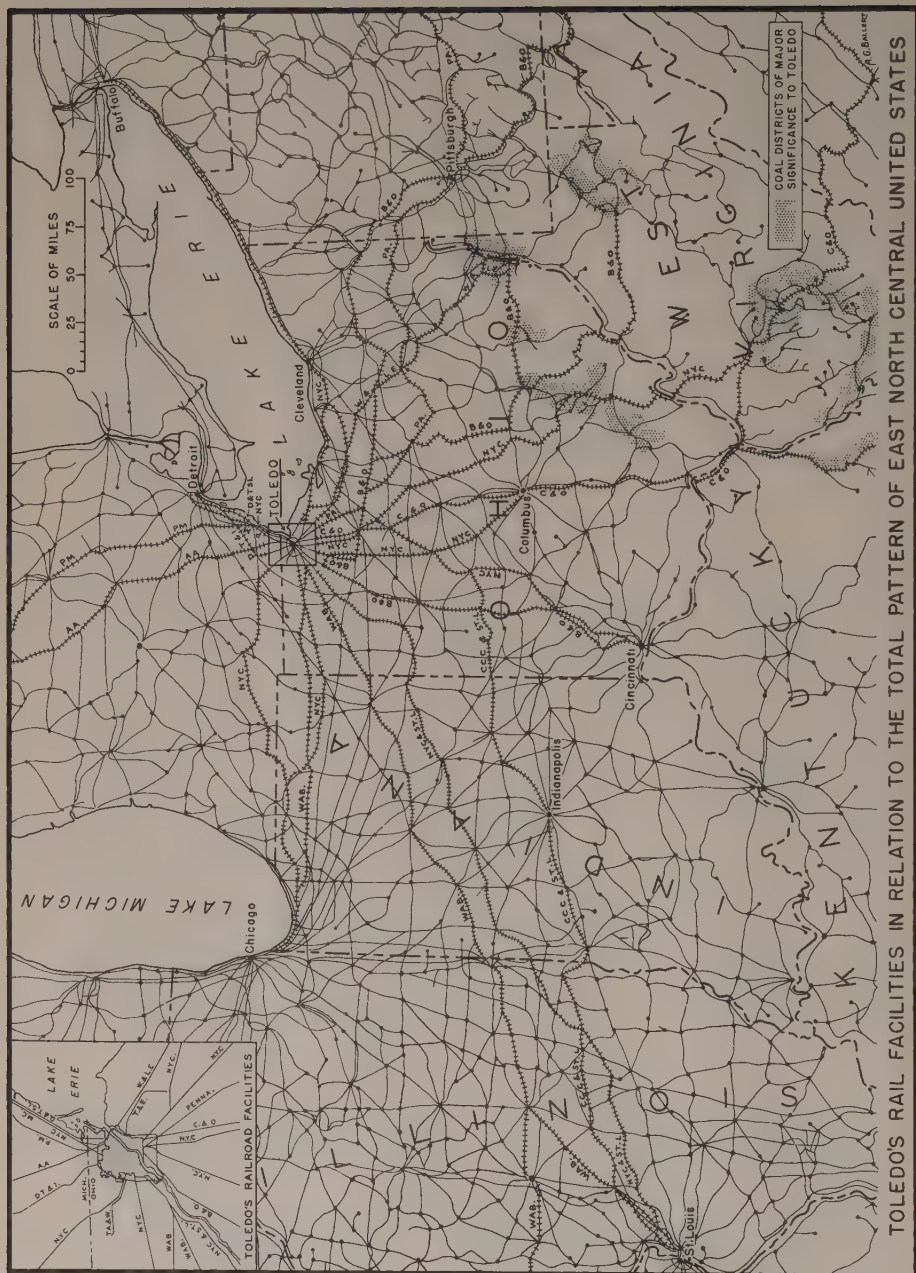


Figure 10

Throughout the development of the rail network in the East North Central states, the lake has aided the focal quality of Toledo. A survey of the salient periods and directions of this growth best explains this function.¹

In the early development of the lower lakes region, Lake Erie provided the most convenient highway westward as far as Toledo. In this period, there was no need for railroads to compete with waterways. Hence, one service started where the other ended. Toledo was the most convenient point for making such a transfer, especially for the area within an arc extending from Dayton, Ohio through Ft. Wayne, Indiana to Jackson, Michigan, as the city was the nearest lake port and was along the easiest route of access to this territory. Here, or at Detroit, the west-bound emigrant had to take to the land or circumnavigate the whole Michigan peninsula. Thus it was that Toledo started her rise as a steam railway terminal the same year that the city was incorporated (1837). The thirty-three mile line to Adrian, Michigan (Erie and Kalamazoo Railroad) was the pioneer railroad of the old Northwest Territory.² Rather than expanding westward in an orderly manner, this railroad had vaulted into the midst of the pioneer country. This was in keeping with the thought at this time that the purpose of the railroad was to connect bodies of navigable water. The prestige value of the Erie and Kalamazoo

The probable major reason for avoiding the city, except for a branch line (formerly an electric railway) to the corporate limits, was the high cost of urban land at this late date. The railroad is a consolidation of a number of short lines. See Poor's Manual of Railroads, 1918, No. 51 (New York: Poor Publishing Co., 1918), p. 1850.

¹Much conflict in dates occurs regarding railroad building. The author has relied largely upon Frederic L. Paxson, "The Railroads of the Old Northwest before the Civil War," (Transactions of the Wisconsin Academy of Sciences, Arts, and Letters, XVII, Part I (1914), 243-74 and a blueprint map by F. B. Sheldon, "Railroads of Ohio," Columbus, 1924. Where any question arose additional sources were consulted.

²It has been suggested that the route of this first railway was affected by the projected course of the Wabash and Erie Canal. The rail line was located to provide service for the major flow of traffic, which was westward, but with the caution to avoid competition from the currently popular canals. See Slocum, op. cit., p. 619.

A much longer early railway extended from Sandusky on Lake Erie to Cincinnati on the Ohio River in 1848. See Paxson, op. cit., p. 255.

Railroad was perhaps its greatest contribution.¹

The panic of 1837 discouraged further railroad construction for the next decade. By 1847, however, extension westward was again under way with the Erie and Kalamazoo having become a part of the Michigan Southern. Competition was keen with the Michigan Central, which was being extended westward from Detroit.² Both lines reached Chicago in 1852. Having found their western terminus, the next step was to close the gaps between the western segments and Buffalo. Competition arose between the routes north and south of Lake Erie. The southern shore was paralleled by rail in 1853 making Toledo the midway and transfer point between Buffalo and Chicago.³ This marked the beginning of the true railroad era as far as Toledo was concerned.

Between 1855 and 1859, four additional lines intersected at Toledo. Two of these, the Wabash and the Dayton and Michigan Railroad, made this point a terminus.⁴ The other two lines, one to Detroit and one across northern Indiana to Elkhart were to become parts of the Lake Shore and Michigan Southern system (now the New York Central) in 1869. Toledo's original lines to the west and east also were included in this consolidation.⁵ Thus at the outbreak of the Civil War, Toledo had six rail tentacles reaching out for trade. Only one route extended eastward, the others being

¹Due to this new facility, Toledo was made the distributing point for mail to northwestern Ohio, Indiana, and southern Michigan. Kerlin, op. cit., p. 50.

²For an account of the early rail routes from Detroit see Almon E. Parkins, The Historical Geography of Detroit (Lansing: Michigan Historical Commission, 1918), pp. 265-67.

³The line through Ontario to Windsor was completed in 1854. Some of the disadvantages of this route in contrast to the southern route have been: (1) the Detroit River barrier which had to be ferried until 1910 when a tunnel was opened, (2) the charge for use of the Detroit River tunnel, (3) the area traversed which provides far less traffic, (4) the lake to the south which eliminates contributing lines from the eastern interior.

⁴By 1856, the Wabash extended 35 1/2 miles to Springfield, Illinois. The Dayton and Michigan now is the Baltimore and Ohio branch line which leads to southwestern Ohio.

⁵This merger did not result in through service immediately. The 1878-79 edition of Poor's Manual of Railroads was the first to list standard gauge (4 feet, 8 1/2 inches) throughout the system. Until this time, the gauge east of Toledo was 4 feet, 9 1/2 inches thus making the city a terminal point.

directed to an area bounded on the east by Detroit and Cincinnati. At that time the Wabash, extending into the vast and rich country of middle Indiana and Illinois, perhaps contributed more than any other line to Toledo's growing commercial position.¹

From 1859 to 1873, no new lines entered Toledo. During this period, however, the Civil War greatly accelerated the rail traffic. Commodities which had gone to the eastern market via the Mississippi now, for security reasons, moved east over the railroads or lake routes.²

In the decade 1873 to 1883, Toledo had its second and greatest period of railway growth. Eight spokes were added to the hub and another was initiated.³ Most of these were extended to Toledo rather than from this center. A major change also occurred in the direction of the lines and in the character of the traffic. Several features of this new impetus are significant of mention. One was the lack of any additional trunk lines--Baltimore and Ohio, Pennsylvania, Nickel Plate (N.Y.C. and St. L.) or Erie--through Toledo. Apparently the Lake Shore line (later to become the N.Y.C.) had proven too strong for competition in the western Lake Erie zone.⁴ However, only the Erie failed to build a branch in order to share in Toledo's trade.⁵

The resulting major directions of the new lines to the Toledo hub were from the south and north. With this change in direction came a change in traffic. Four of the five routes from the south and southeast originated or passed through the coal fields of Ohio. Hence these roads developed as freight carriers. In contrast, the east-west lines had as their early prime function the transport of new settlers and merchandise to the interi-

¹Cf. Knapp, op. cit., p. 624.

²Gephart, op. cit., p. 182.

³A line which is now the Columbus branch of the N.Y.C. was started in 1883 but did not reach that city until 1893.

⁴In 1872, the N.Y.C. route via Sandusky Bay was opened. Though only six miles shorter than the route via Norwalk, this has become the main line.

East of Cleveland only the Nickel Plate has been able to invade the New York Central corridor which occupies the narrow lake-border plain.

⁵The city built the Toledo and Woodville Railroad (17 miles) in 1873. This became a part of the Pennsylvania's route to Toledo.

or. The new lines to the north reached areas with different economies. Two, the Ann Arbor and the Pere Marquette, tapped the richly forested sections of central and western Michigan.¹ The other was the third of five lines which were to link Toledo and Detroit. All of the lines in this decade terminated in Toledo.²

Only two major rail developments entered Toledo after 1883 and both came from Detroit. This correlates with the period of rapid growth which the automobile capital and its tributary area were beginning to experience.³

In addition to the above-mentioned new lines, the Wabash railroad built a branch from Toledo (1902) to intersect its Detroit-Chicago line. Thus Toledo gained another entrance to the latter city.

The Toledo, Angola and Western and the Toledo Terminal were constructed shortly after the turn of the century, but as both are local in character, they are considered in the latter part of this section. In this same category is the Toledo and Eastern, which was formerly an interurban passenger line but which now handles freight in the area east of Toledo.

A recapitulation of Toledo's rail ties with the Middle West shows twenty routes entering the metropolitan area over eighteen right-of-ways owned by eleven companies (inset in Fig. 10).⁴ Four of these companies (Wheeling and Lake Erie; Detroit, Toledo and Ironton; Detroit and Toledo Shore Line; and Nickel

¹The P.M. built to Monroe, Michigan in 1872. From this date until 1897, when it completed its line to Toledo, the L.S. and M.S. tracks were used. There is also a branch to Detroit. See Paul W. Ivey, The Pere Marquette Railroad Company (Lansing: Michigan Historical Commission, 1919), pp. 220, 229, and Clark Waggoner, History of the City of Toledo and Lucas County, Ohio (New York: Munsell & Co., 1888), p. 416.

²The Pennsylvania now continues north to Detroit using the Pere Marquette tracks about half the way.

³Cf. Bert Hudgins, "Evolution of Metropolitan Detroit," Econ. Geog., XXI (July, 1945), 219.

⁴Some miles south of Toledo, both the N.Y.C. and the B. and O. branch into two lines. The N.Y.C. and the M.C. tracks between Toledo and Detroit are considered as one line, as they are used as a unit--each carrying traffic in one direction.

In enumerating companies, the Big Four or C.C.C. and St.L. is a part of the N.Y.C. system. Of the 18 right-of-ways, 7 are a part of this system.

Plate) only handle freight at Toledo.

The Toledo rail hub traffic reveals many of the features of the major channels of trade in the interior portion of the manufacturing belt. Among the outstanding groups of traffic are six: (1) the seasonal movement of coal and ore between Toledo and areas to the south;¹ (2) the flow, also seasonal, of wheat into Toledo from areas principally to the west and southwest;² (3) the movement of sheet and coil steel from the Cleveland-Pittsburgh district to Toledo and Detroit;³ (4) the traffic in automobile parts and accessories through and from Toledo to Detroit; (5) the through east-west traffic with necessary interchange at Toledo by all railroads except the New York Central, which plays a leading rôle in this longitudinal flow of goods (Fig. 11A);⁴ and (6) a large proportion of the total traffic between Michigan and the states to the east and south.

The number of trains required in handling this flow of freight traffic to and through Toledo in 1944 is shown in Figure 12.⁵ Especially significant is the fact that only eighteen freight

¹As shown in Fig. 11B, the volume is dominantly coal north-bound for transfer to lake vessels. This traffic is very low in the winter months. For a discussion of the coal movement see chap. 11, pp. 90-98.

Some coal moves on northward by rail. The importance of this flow to railroads in the Toledo-Detroit area is exemplified by the traffic of the Detroit and Toledo Shore Line. Bituminous coal accounted for 41 per cent of the total carloads and 55 per cent of the total tonnage in 1945 (U. S. Interstate Commerce Commission, Freight Commodity Statistics [Washington: Government Printing Office, 1946], p. 39).

²In 1945, a total of 19,588 cars carrying 33,035,050 bushels of grain were received in Toledo. This accounted for 70 per cent of the total grain receipts. The remainder was received via the lake. Computed from reports of the Toledo Board of Trade.

³Highway carriers have cut heavily into this business as well as into the commodities mentioned in item 4.

⁴The density of traffic on the N.Y.C. system as well as Toledo's key position in this flow are illustrated effectively in a map in Fortune, XX (November, 1939), 54-55.

⁵As statistics on the volume of traffic originating at, destined for, and through Toledo are not published for the individual railroads, the number of daily scheduled trains provides the only relative measure of this flow. It is recognized that trains may vary widely in the number of cars carried. Also some scheduled trains have several sections. However, the figures given are for the normal schedules operating on each line, and

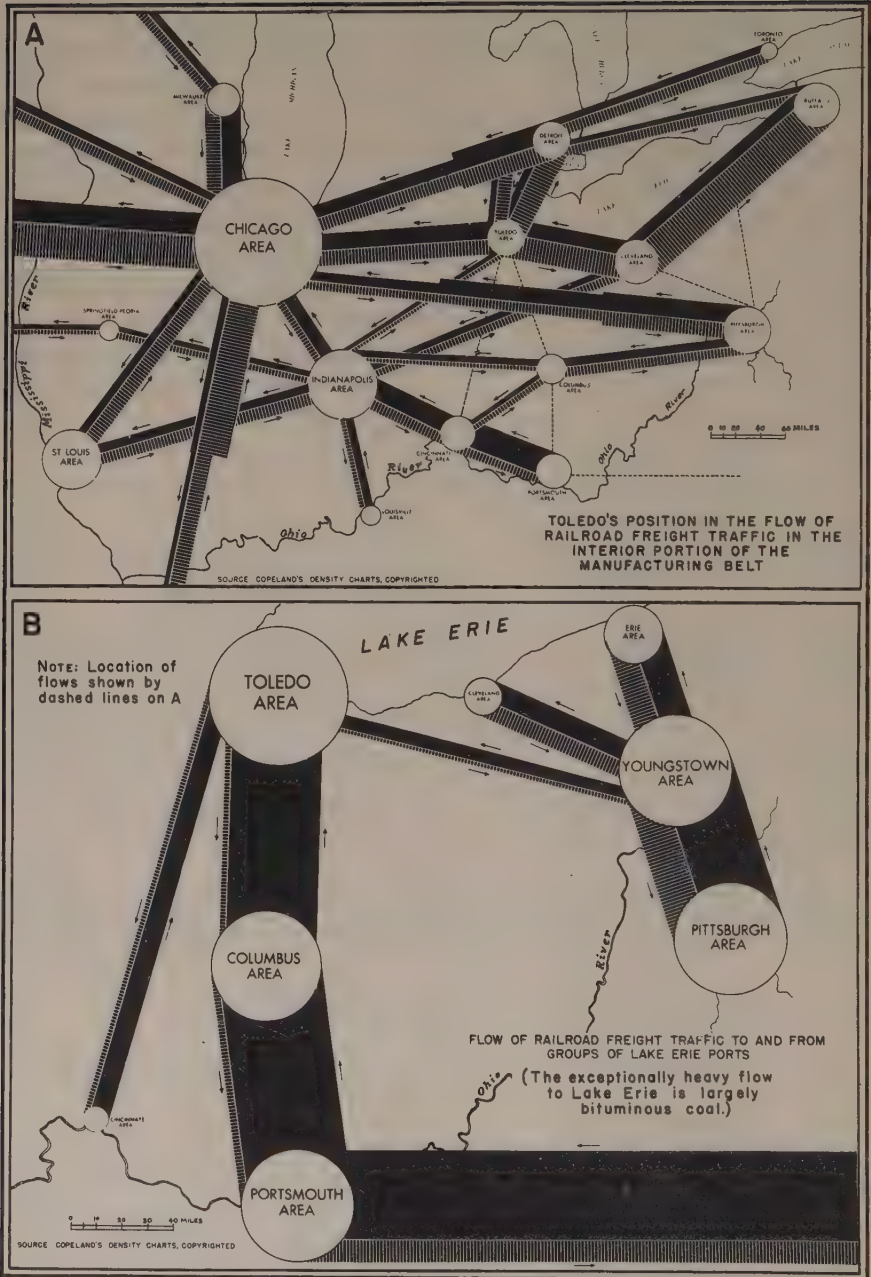
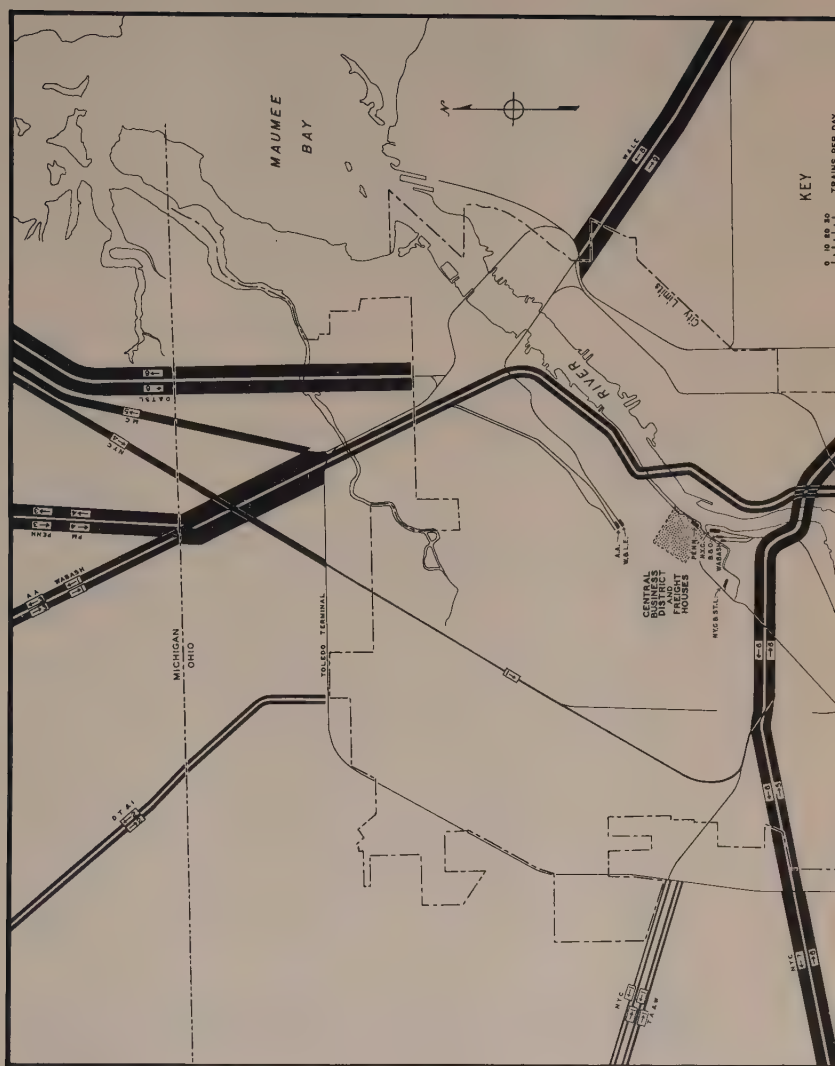


Figure 11. Toledo and the Flow of Railroad Freight Traffic



trains pass through the city, whereas sixty-seven originate and seventy-five terminate here daily.

Passenger train traffic to and through Toledo differs in several respects from the freight movement, namely: (1) the flow is dominantly east-west, largely a result of the New York Central's "water-level" route; and (2) the less important position of Toledo as a terminus for passenger trains (Fig. 13).¹ Two reasons may be given for this latter fact. One is the greater relative importance of the New York Central in the passenger traffic than in the freight traffic of the Toledo hub. Secondly, the necessity of greater service to attract passenger traffic has encouraged the use of foreign roads to extend routes to Detroit, a major source of business.²

Vicinal Function

The railroad facilities within Toledo and its immediate vicinity are numerous, but an orderly pattern makes for their efficient utilization. The city's function as a rail terminal gives rise to many of these facilities.³

Rail yards are encountered along nearly all approaches to the city (Fig. 1). The extent of these storage and classification yards is much greater than normally would be the case for a community of Toledo's size. The total capacity of the twenty-eight yards is over 56,000 cars.⁴ A major use for several of the large

there have been few changes made in these since 1944, the year which provides the data for the flow maps.

¹Only 14 trains had Toledo as a terminal point while 56 or 80 per cent continued on through the city in 1944, the date used in the flow map. The volume of rail passenger traffic originating from Toledo could not be disclosed by the Public Utility Commission of Ohio.

²In 1940, the population of the Detroit metropolitan district was about 2,300,000.

³Approximately 297 locomotives work in and out of Toledo daily. See A Survey of Heating and Power Plants: City of Toledo (Cincinnati: Coal Producers Committee for Smoke Abatement, 1946), p. 6a. (Mimeographed.)

⁴The N.Y.C.'s Stanley yards and the C. and O.'s Walbridge yards southeast of the city have capacities of 8,200 and 7,880 cars respectively. These figures are from a survey of the Federal Coordinator of Transportation in 1936. Data from files of the Toledo Chamber of Commerce.

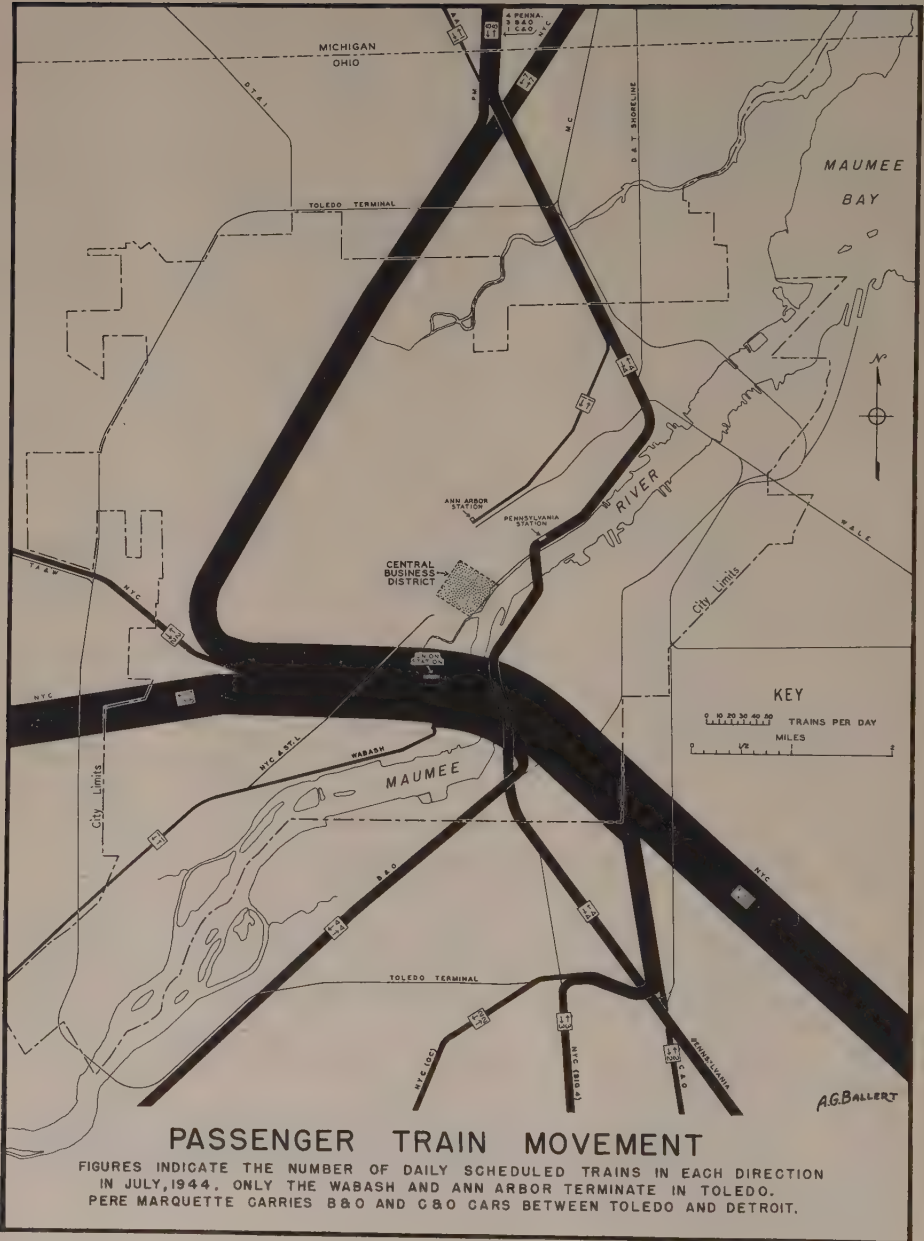


Figure 13

yards is for storage of coal awaiting transshipment by water.¹ In addition, the termination of most of the rail lines at Toledo necessitates extensive classification yards for sorting cars to and from other railroads and local industries.²

Nearly all the classification yards are located near the Toledo Terminal, a railroad which completely encircles the city.³ This belt line of 28.6 miles is double-tracked except for several miles in the southwest sector where traffic is lightest. All of the railroads in the Toledo area utilize this belt line for interchange, and some use parts of it to complete their routes.⁴ For interchange, the railroads can use their own pullers. However, if the number of cars to be transferred is small, the belt

¹To efficiently serve the huge lake freighters, a large supply of coal must be on hand when the boats arrive. About 185 carloads of coal can be carried by the average vessel of 11,000 tons capacity.

In 1945, there were 384,918 cars of lake coal which terminated at Toledo (Files of the Toledo Chamber of Commerce).

²The terminal is a major factor in the total rail haul from the standpoint of time and expense. A survey of the U. S. Federal Coordinator of Transportation shows that in a typical freight car movement, the terminal accounts for 70 per cent of the total time the railroads have a car (Freight Traffic Report, Vol. II [Washington: Federal Coordinator of Transportation, 1936], p. 71).

³The line was completed in 1903 and is owned jointly by 9 railroads. St. Louis and Kansas City have similar multiple-owned terminal lines, but as far as the writer can find Toledo is the only city in the United States having a single organization operate a line completely around a community.

From 1904 to 1907, the Morgan interests utilized the Terminal line and station as a part of their Great Central Route, which extended from Michigan to Cincinnati via the Pere Marquette and the Cincinnati, Hamilton and Dayton railroads. Interview with Mr. A. B. Newell, President, Toledo Terminal Railroad.

Other short connecting lines within the city are the Toledo Belt Railway (W. and L.E.) and the Bay Terminal Railroad east of the river and the Manufacturer's Railroad along the west shore extending to the Central Business District.

⁴In 1945, the Toledo Terminal handled about 232,000 cars and, in addition, nearly 1,789,000 cars were handled over the belt line by other railroads (Annual Report of the Toledo Terminal Railroad Company for the Year Ending December 31, 1945 [Toledo: Toledo Terminal Railroad Company, 1946], pp. 14-15).

The heaviest traffic is along the eastern portion of the belt line to connect the southern and eastern railroads with the northern lines.

line service, which operates on a schedule, usually is chosen.¹ Besides the transfer of cars between the different lines, there also is service to the industries along the belt line.² This availability has been an important factor in the choice of industrial sites in the periphery of the city.

Other facilities for the freight traffic are repair shops and roundhouses, freight houses, and coal docks.

In the Toledo area, there are nine roundhouses and, of the total yard capacity, the space for about 2,200 cars is used for repairs. Largest of the repair shops is the New York Central's Air Line Junction.³ This is the only major yard and shop on the western border of the city. Nearby is the Southern Wheel Company and the Federal Creosote Company, both providing products for this New York Central division point.

The major freight houses are located near the center of the city (Figs. 8 and 20). The Middle Grounds, a peninsula between the Maumee River and Swan Creek near the Union Station, is the center of this activity.⁴ The three freight stations located here can accommodate some 400 cars on their house and team tracks. Across the creek at the end of the Manufacturer's Railroad is

¹Another method of interchange is the clearing yards system used in Chicago. Under this procedure, the sorting of cars for foreign roads is accomplished at one or more of the clearing yards where trains are broken up and regrouped according to their various destinations. Such a system seems neither necessary nor advisable in Toledo, for no matter what site might be chosen it would prove disadvantageous for a number of the railroads to reach. For a treatment of the terminal facilities at Chicago see Harold M. Mayer, The Railway Pattern of Metropolitan Chicago (Ph.D. dissertation, Dept. of Geography, University of Chicago [Private edition, Distributed by the University of Chicago Libraries, 1943]).

²For the year 1945, the number of carloads of freight originating in Toledo was 159,256, and the number terminating was 167,705. (Files of the Toledo Chamber of Commerce). See n. 1, p. 67 for less-than-carload traffic.

³One hundred and twenty-one engines work out of this point. See A Survey of Heating and Power Plants: City of Toledo, op. cit., p. 6a.

⁴Originally the Middle Grounds was a low marshy area. It was developed first for passenger traffic and as a hotel site. Large grain elevators were built on this property, for here canal, lake, and rail transportation met. See J. H. Doyle, A Story of Early Toledo (Bowling Green, Ohio: C. S. Van Tassel, 1919), pp. 67-68.

another freight house. Other freight houses are located in the border of the Commercial Zone. Some of these facilities are used jointly by several railroads.¹

A greater number of railroads have coal docks in Toledo than at any other Great Lakes port. Three of these rail-water terminals for the transfer of coal to lake vessels are located here. Iron ore for southern Ohio furnaces also is unloaded at two of the docks. With six car dumpers, Toledo has double the number of any other lake port.² All of the coal docks are on the east side of the river where they can be reached easily by railroads from the south. The removal of the two upriver coal docks (N.Y.C. and B. and O.) to a combined dock on the shore of Maumee Bay by 1948 will require the utilization of a section of the Toledo Terminal in order to reach this bay-front location. Such a procedure is used by the Chesapeake and Ohio to reach its huge docks and yards at the mouth of the river (Fig. 16).³

Toledo has three passenger stations, but sixty-one of the seventy passenger trains entering the city daily are handled through the Union Station (Fig. 13).⁴ This accounts for 87 per cent of the total passenger train traffic. However, if passengers are considered instead of trains, the percentage is about ninety-five. It has been suggested that one and perhaps both of the other passenger stations be eliminated when the proposed new Union Station is completed. Since, as previously mentioned, 80 per cent of the passenger trains provide service through Toledo, the

¹The freight stations accounted for a large proportion of the less-than-carload freight originating and terminating at Toledo. The totals for 1945 were 43,736 originating and 44,392 terminating (Files of the Toledo Chamber of Commerce). A detailed survey of the Toledo freight stations is given in Railroad Transportation, A Report Prepared by Harland Bartholomew (Toledo: City Plan Commission, 1924), pp. 27-33.

²For a listing of equipment at coal terminals on the lower lakes see U. S. Army, Corps of Engineers, Board of Engineers for Rivers and Harbors, Transportation on the Great Lakes, Transportation Series No. 1 (rev. ed.; Washington: Government Printing Office, 1937), pp. 325-32 or MacQuown's Directory of Coal Docks on the Great Lakes (Pittsburgh: National Coal Publications, Annual).

³A more detailed discussion of the coal traffic and loading facilities is given in chap. ii, pp. 90-98.

⁴The dates of erection of the three stations are: Pennsylvania, 1879; Union (N.Y.C.), 1886; and Ann Arbor, 1896.

city can never expect to benefit from transient business as have Chicago and St. Louis.

Section 3. Highways and Streets

The development and effect of highway transportation as an important facility in Toledo's growth has been relatively recent.¹ The 1920's brought about the coordination of America's varied highway pattern.² Improvement of this facility has served to further emphasize the city's strategic position on the natural routes of transportation.

Six national highways (U. S. 20, 23, 24, 25, 68, and 223) and seven state highways (Ohio 2, 65, 102, 120, 199, 246, and 577) focus on the Toledo area (Fig. 8). Among the federal highways, four are especially important interregional routes. Three of these routes end north of Detroit and have their other termini in Georgia (U. S. 23 and 25) and Colorado (U. S. 24). Major cities which are intersected by these interstate highways enroute to the latter termini include: Columbus, Ohio on U. S. 23; Ft. Wayne, Indiana on U. S. 24; and Cincinnati and Dayton on U. S. 25. The most important east-west interregional highway through Ohio is U. S. 20, which passes through Maumee south of Toledo.³ This 2,400 mile route extends from Boston through Chicago to Yellowstone National Park. A short but important federal highway is U. S. 223, which originates in Toledo and leads to central Michigan. However, from the standpoint of the city, the greater utility of this last-mentioned route is to serve the rapidly increasing residential de-

¹This may be exemplified by the dates of improvement and construction of routes U. S. 24 and 25 which connect Toledo and Detroit. The latter first was paved in 1921 and remained the only through route between the two cities until 1926 when U. S. 24 was constructed. In 1935, it became expedient to widen this latter route. Letter from Murray D. VanWagoner, Michigan State Highway Commissioner, March 12, 1940.

²The Federal Highway Act of 1921 authorized the Secretary of Agriculture, in cooperation with state highway departments, to designate a system of main interstate and intercounty routes.

In 1904, the Ohio State Highway Department was created. For a study of the sequent developments of highways in Ohio see William W. Shideler, "The Highway Pattern of Ohio," (Unpublished Master's thesis, Dept. of Geography, University of Chicago, 1939).

³The business route alternate of U. S. 20 intersects the Central Business District.



Figure 14

velopment on the western border of the city.

Most traveled among the State routes entering Toledo are Ohio 2 and 120. The former provides an alternate from U. S. 6, intersecting this coast to coast highway at Sandusky and Bryan, east and west of Toledo. Removal of the toll bridge charges at Sandusky Bay in 1946 has resulted in an increase of traffic along Ohio 2, a scenic lake-border highway which provides the shortest route between Toledo and Cleveland (113 miles). Ohio 120 branches off U. S. 20 about 20 miles southeast of Toledo (Fig. 14 inset) and carries much of the traffic from the east enroute to Michigan through the Commercial Zone of Toledo. These federal and state highways, together with interconnecting routes, provide Toledo with direct, hard-surfaced highways to the principal centers of the Middle West.

As this dissertation was nearing completion (fall, 1946), three important national routes (U. S. 23, 24, and 25), which passed north-south through Toledo were altered to ~~by-pass~~ the city along its western border (Fig. 8). With the realization of the proposed interregional highways, however, the flow of these routes again will be directed through the heart of the city. Despite the present by-passes, most of the interregional commercial traffic--motor trucks and busses--passes through Toledo, as the city provides these carriers with an important source of revenue.

The peak flow of highway traffic occurs in the Commercial Zone of the city (Fig. 14). One-way streets have been introduced here in an attempt to improve the efficiency of the narrow streets in this area.

As the business route alternates of U. S. 23, 24, and 25 continue to follow their former courses and as no figures are available yet on the new system, the pattern here described is that which was in effect until fall, 1946. The maps in Figure 14 will not be changed greatly in the future, as local vehicles dominate the flow shown in the city pattern, and the inset map presents the flow of extraurban traffic toward the Toledo area. Toledo continues to lie along the shortest route from the east and southeast to Michigan and, as such, a combination route utilizing Ohio 120 and U. S. 23, 24 or 25 still will carry heavy flows of traffic between these broad areas.

Regional and Urban Pattern and Flow

Toledo is a focal point in the regional and interregional highway pattern. The physical factors previously mentioned as aiding the city's development in other forms of transportation are, in general, also true for highways. However, several conditions have prevented the radial highway pattern from having the degree of symmetry which marks the railroad and electric inter-urban pattern. Among the major factors are (1) the grid survey pattern of the interior lowlands which has directed many highways to follow the cardinal points of the compass;¹ (2) the construction of highways with public funds for public benefit which has encouraged a wider distribution of routes and some by-passing of congested centers; (3) the Maumee River, a natural route which has directed two highways to Toledo--U. S. 24 along the left bank and Ohio 65 along the right; and (4) the featureless lake plain which has permitted a wide latitude in the choice of routes.

With regard to item four above, it should be noted that the low-lying, essentially flat terrain about Toledo was not conducive to good roads in the early period. Beach ridges, which frequently have influenced the location of early roads in lake plain areas, are not a factor at the head of Lake Erie. The Black Swamp east of Toledo made the first highways well-nigh impassable. However, the first route from the east, now U. S. 20, cut directly across this huge mire but at a distance of 13 miles back from the lake shore. The poor condition of the early roads emphasized the need for the railroads, both steam and electric.

The highway pattern which has developed in the Toledo area is a double star of converging routes. The major clustering is in the Commercial Zone of Toledo, while the secondary center occurs at the Maumee-Perrysburg bridgehead, about 10 miles southwest of the major hub (Fig. 8). Some of the routes intersecting at the latter focus continue on to the Commercial Zone. However, the two most important interregional highways (U. S. 20 and 25) are directed around this core area.² As previously mentioned,

¹Diagonal routes, however, frequently serve human needs better and thus are better surfaced and wider in the Toledo area. Cf. Shideler, op. cit., p. 157.

²This is of especial interest, since these are the oldest routes in the area. In the early period of development, the Black

U. S. 23 and 24 now by-pass the Commercial Zone, but the business routes (BR) of each of these federal highways intersect this center.

Seven major highway routes make a junction at the intersection of Monroe and Summit streets, the southeast corner of the Central Business District. They are U. S. routes BR 23, BR 24, 68, and 223 and Ohio routes 65, 246, and 577. Two national (U. S. 68 and 223) and three state highways (Ohio 65, 246, and 577) terminate here (Fig. 8). The routes which do not intersect at this center other than the national routes 20 and 25 are Ohio 2, 102, 120, and 199. Among this group, only Ohio 2 does not have a terminus in Toledo. All thirteen of the highways are hard-surfaced.¹

The dense flow of traffic over the above-described highway pattern places Toledo in a key position in respect to the volume as well as to the distribution of routes.² The heaviest flow of the 14 per cent of highway traffic which passes through Toledo is that moving between southeastern Michigan and areas east and south of Toledo.³ Five major highway routes head north from Toledo

Swamp hampered road building to Toledo from the east. As a result, the first road (1825) reached the Maumee River at Perrysburg. Still poorer conditions nearer the lake prevented following the shore zone. Crossing the river to Maumee, the route took a direct line for Detroit along the military road from Cincinnati to Detroit thus missing early Toledo. Today these sections east and west of the river are followed by U. S. 20 and U. S. BR 25 respectively. Cherry Street in Toledo later was developed to tie the city into this route. See Harvey Scribner (ed.), Memoirs of Lucas County and the City of Toledo, Vol. I (Madison, Wisconsin: Western Historical Association, 1910), p. 91.

¹Lucas County has a greater mileage of hard-surfaced highways than any other county in the state (U. S. Department of Agriculture, Soil Survey of Lucas County, Ohio, Series 1934, No. 24, p. 5.

²This is well illustrated in the interregional traffic maps in U. S. Congress, House, Committee on Roads, Toll Roads and Free Roads, House Doc. No. 272, 76th Cong., 1st Sess. (Washington: Government Printing Office, 1939), plates 7 and 59 and U. S. Congress, House, Committee on Roads, Interregional Highways, House Doc. No. 379, 78th Cong., 2d Sess. (Washington: Government Printing Office, 1944), Fig. 20.

³A survey in 1942 shows a total of 11,040 vehicles in 24 hours on routes U. S. 24 and 25 north of Toledo. About 36 per cent of these vehicles had their origins and destinations outside the survey cordon which surrounded the Toledo area. On Ohio 120 east of the city, the figure was 22 per cent. The through traffic crossing all points along the cordon was 13.9 per cent or

across the Ohio-Michigan line. Plans are under consideration to develop a by-pass lakeward of Toledo's Central Business District (Fig. 14). This would divert the dense flow of through traffic away from the heart of the city.¹ Since the completion of the Ottawa River bridge in Point Place in 1942, a route (U. S. Alt. 24) has been extended along the west river and bay shore and thence into Michigan where it intersects the major Detroit-bound traffic. In conjunction with the proposed lower river by-pass, this route will develop into the major corridor into Michigan.

The Detroit-Toledo highway (U. S. 24 and 25) is the second heaviest traveled intercity route in America, carrying 12,000 cars per day in 1940.² East of Toledo, the Ohio route 120 carries the densest traffic.³ The routes to the south and west also carry sizable traffic. Greater distances to large centers in these directions, however, result in lower densities. West of Toledo, U. S. 20 has gained traffic which formerly followed U. S.

12,002 cars. See Toledo, Ohio: Regional Traffic Study, 1943, A Report Prepared by the Ohio Department of Highways and the City of Toledo (Toledo, 1943), p. 104. (Processed.)

¹A recent study shows the policy of by-passing as a solution to highway problems in the zone of cities to be ill-founded. The majority of the traffic, especially at the approaches to large cities, either has originated or is destined for the city. The percentages of traffic in Ohio having various origins and destinations are as follows: (1) both urban, 67.5; (2) one urban, 29.7; (3) both rural, 2.8. For the United States, the group "both urban" is 49.6 per cent. With these and additional findings, it has been proposed that the interregional highways pass through the cities either by elevating or depressing the routes. See U. S. Congress, House, Committee on Roads, Interregional Highways, op. cit., pp. 40-47.

For an interregional highway plan for Toledo see Transportation Report, Central Business District: Toledo, Ohio, A Report Prepared by Parsons, Brinckerhoff, Hogan & Macdonald (Toledo: Toledo Chamber of Commerce, 1946), pp. 1-28.

²From a speech by G. Donald Kennedy, Vice Chairman of the Interregional Highway Committee, Washington, D. C., on July 17, 1945 in Toledo. The heaviest rural traffic is in sections of the Atlantic Coast highway between New York City and Washington.

U. S. 24 and 25 are one route through part of the distance between Toledo and Detroit.

³An inspection of the Ohio Department of Highways' 1941 Traffic Flow Map shows U. S. 24 and 25 and Ohio 120 carrying the heaviest flows into a city of any highways in the state. The totals were 13,443 for the former and 12,617 for the latter.

6, a parallel route.¹ Straightening and widening U. S. 20 has attracted the additional traffic.

An important phase of the total traffic through Toledo is that of a commercial nature.² In the latter part of this section, major cognizance is given to this flow of busses and trucks, as they contribute more directly than private cars to Toledo's position as a regional transportation center. Also their terminal features affect land use in the city.

Toledo's street pattern does not follow any orderly system. When the original proprietors platted the land into city blocks, the streets were laid out parallel with the river (Fig. 5). In later developments, the majority of the local streets were oriented north-south and east-west (Fig. 1). Numerous jogs have resulted from platting new additions without thought of coordination of the pattern. Superimposed on this gridwork are the main thoroughfares which, in general, radiate from the Central Business District. The river also has been effective in altering the street pattern in its vicinity. No marked street grades exist in the city except for a distance of one block along the river bank in the oldest section of the city.

The traffic flow map of the city and vicinity (Fig. 14) speaks largely for itself.³ However, several developments of recent years affecting the flow should be mentioned. In 1931, the Anthony Wayne suspension bridge was completed. This construction has altered both the urban and regional flow of traffic. Addi-

¹Nevertheless, an important volume of east-west highway traffic utilizes U. S. 6 which, together with the portion of U. S. 20 east of Toledo, avoids the fringe of urbanism along the south shore of Lake Erie.

²Of the total traffic entering and leaving the city, approximately 12 per cent is commercial. For a comprehensive study of the traffic conditions and requirements of Toledo see Traffic Planning Report: Toledo, Ohio, 1937, Prepared by Jensen, Bowen and Farrell (Ann Arbor: Craft Press, 1938).

³Figure 14 is adapted from Toledo, Ohio: Regional Traffic Study, 1942, op. cit., p. 46. There also are peak hour, truck, and public transportation flow maps in this publication. The inset is from the Ohio Department of Highways' 1941 Traffic Flow Map. The survey entitled Traffic Planning Report: Toledo, Ohio, 1937, op. cit., p. 15, shows the flow in the Central Business District. Charts also have been made portraying the automobile traffic flow zone of residence to zone of employment (Toledo and Lucas County Plan Commissions, op. cit., pp. 26-27).

tional use will be made of this bridge if the following highway proposals are realized: (1) development of an interregional highway through Toledo with the bridge as an integral part of the plan, (2) development of right-of-ways to provide direct approaches to the bridge from the west via Nebraska Avenue and from the south via Anthony Wayne Trail (Fig. 14). The Anthony Wayne Trail is the most recent highway development in the city.¹ Leading south from the Commercial Zone, it was built on the site of the Miami and Erie Canal. At present, it serves chiefly as an express highway for upriver and south suburban districts.

As the efficiency of the rural highways and city thoroughfares increases, the centrifugal and centripetal forces of these arteries are extended. A major result of the outward pull has been the large suburban growth, especially west of the city.² The numerous excellent roads direct the regional and interregional highway traffic toward Toledo. Another important feature of this road system is the ease of accessibility to Toledo which it provides to all sectors of the trade area.

Interurban Bus Transportation

Interurban bus transportation finds its ultimate expression and complexity in Toledo. The close proximity of a number of large industrial and commercial cities and numerous intermediate-sized centers provide the patronage and impetus for the high volume of this low-cost passenger transportation. There is a daily exodus from Toledo of 357 scheduled busses.³ These carriers can be divided into three categories: (1) those destined for other major cities, (2) those to smaller cities in the hinterland of Toledo, (3) those providing service to the suburbs and nearby

¹The segment south to Maumee was opened in 1939. Only passenger traffic is permitted, and curb cuts are prohibited in order to maintain the efficiency of the thoroughfare. The present city terminus, at the southwest corner of the Wholesale-Terminal District (Fig. 20), is poorly located.

²Figure 14 suggests this development by the numerous sizable flows in this direction.

³Except as otherwise documented, figures in this subdivision are based on the schedules of the nine bus systems as of August, 1946. This was supplemented by assistance provided by Mr. C. E. Booth, Manager, and Mr. S. S. Kupper, Auditor, Greyhound Terminal.

villages.¹

The five bus systems in the intercity group have a total of 156 departures daily. Of the total, fifty-six are to Detroit and twenty-five are to Cleveland or beyond.² Of prime importance is the Greyhound system, which has four interstate divisions operating from Toledo. This service well might be compared to the New York Central from the standpoint of the large proportion of the total volume (120 scheduled departures daily) which it contributes to Toledo's position and also due to the fact that it is the only line of significance which has through service.³ Only the fourteen busses of Great Lakes Greyhound, Incorporated which serve Michigan have Toledo as a terminus. American Buslines runs between New York and the West Coast. The Cincinnati and Lake Erie, Lake Shore, and Short Way Lines each have busses to both nearby and distant termini.

Only twenty-seven busses daily run from Toledo to the intermediate urban centers which lie in the hinterland of the city. However, nearly all of the significant communities are served by this group or by enroute intercity busses.

The 174 daily suburban departures reach the extent of their trips in approximately one-half hour. Some of the routes not traversed by this kind of service are tended by the previously mentioned type. Increasing industrialization and residential building in the fringe area of the city have prompted a marked increase in the short-haul service.

All of the motor coach arrivals and departures in Toledo,

¹A recapitulation of the interurban bus facilities of Toledo in 1928 shows ten companies operating 197 outbound units daily. Only thirty-eight were destined for major cities, thirty-two went to the hinterland, and 127 to suburban areas. There were eight electric interurban lines still operating at that time (Toledo Port Survey of 1928, Report by Griffenhagen & Associates, Ltd. [Toledo: Commission of Publicity and Efficiency, 1928], pp. 40-41).

²During August, 1946 an average of about 300 full-fare tickets were sold daily for Detroit alone.

³During August, 1946 there were 5,562 Greyhound departures from the Toledo terminal. This is an average of 180 per day or sixty more than scheduled. Extra sections of scheduled units account for this figure.

There were 260,000 tickets sold in Toledo by Greyhound in 1943. For ten months in 1945, the tickets sold totaled 222,000. A two-month strike reduced the total.

except for one suburban line, occur at two terminals in the Central Business District (Fig. 19).¹ These terminals were erected in order to eliminate the parking of busses on the downtown thoroughfares. The suburban units, however, park in the streets and cause considerable added congestion during the rush-hour period.

Motor Carriers

Highway freight like that by rail finds Toledo an important focal point. The factors of position in relation to inter-regional routes and proximity to numerous industrial communities provide the "raison d'être" for the heavy volume of this traffic. The greatest advantages held by this service over the railway is in short-haul and less-than-carload quantities.² Decentralization of the outstanding industry of the western Lake Erie region--automobile parts and equipment--makes trucking vitally important. As in the railway traffic, Toledo serves both as a transfer and as a terminal point. Many of the major highway carriers of the interior portion of the American Manufacturing Belt make Toledo a focal point in their route patterns. However, due to the single-unit character of highway carriers, a considerable number continue non-stop through the city. The only contribution of the latter traffic to Toledo is the congestion it adds along the major thoroughfares, which must serve both a local and interurban flow.

The commodities carried are highly diversified, but the flow is well-balanced inbound and outbound except that with the

¹The Greyhound Bus Depot serves four lines besides the Greyhound system. Although built in 1935, it already has outgrown the present facilities. The other terminal, Toledo Bus Center, is in close proximity to the former interurban passenger station.

²Trucks largely have eliminated railway competition between Toledo and Detroit, a distance of approximately 55 miles. Many of Toledo's smaller manufacturers do not have carload quantities to ship and, therefore, door-to-door service is ideal for their use. However, considerable traffic out of Toledo by truck moves to the coasts. It takes seven or eight days to reach the west coast and three to four days to reach the east coast. Interview with Mr. F. H. Thompson, Jr., Vice President, Liberty Highway Company, Toledo.

Approximately 98 per cent of the total railroad traffic of the country consists of carload freight (H. E. Stocker, Motor Traffic Management [New York: Prentice-Hall, Inc., 1938], p. 100.

territory east of Toledo. Here the westbound traffic is considerably heavier. The non-stop units travel chiefly from the Cleveland-Pittsburgh area to Detroit and vicinity carrying everything from general merchandise to coils and sheets of steel on large flat trailers. A reverse movement of new automobiles and trucks, many carried on specially designed trailers, from Detroit through Toledo to eastern and southern United States is undoubtedly the heaviest traffic of its type in the world.¹ Detroit, obviously, is the most important objective of Toledo trucks.

Motor freight terminals chiefly are located in the Wholesale-Terminal District (Figs. 8 and 20). The major reasons for location here are (1) available facilities--the former interurban freight houses and lumber yard sheds, (2) available land at low price for trailer storage, (3) nearness to business--wholesale and retail districts, and (4) proximity of the two river bridges open to truck traffic.²

Sixty-eight intercity motor carriers had terminal facilities in Toledo in the fall, 1946.³ As several truck lines frequently utilize the same building, the number of these motor freight depots totals thirty-seven. It is difficult to state the number of units which operate in and out of Toledo due to wide variation in the sizes of companies. They range from organizations such as Norwalk, Liberty Highway and Commercial with a total of about 140 trucks in and out daily to the one and two-unit companies. A survey shows forty-five companies having approximately 425 units entering and about the same number leaving the city daily.⁴ An estimate for the fifty-eight motor carriers which provide both inbound and outbound service at Toledo would be approx-

¹Albert G. Ballert, "The Geographic Foundations and Developments of Monroe, Michigan" (Unpublished Master's thesis, Dept. of Geology and Geography, Syracuse University, 1940), p. 40.

²Due to the great weight of most intercity motor carriers, only two bridges, the Cherry and Anthony Wayne, are open to this traffic. The former chiefly is used by through service, while the latter leads into the Wholesale-Terminal District.

³Toledo Chamber of Commerce, Toledo Motor Carriers Directory (Toledo: Transportation Dept., December, 1946).

In 1928, thirteen truck lines served Toledo (Toledo Port Survey of 1928, op. cit., p. 41).

⁴The survey was made during August and September, 1946 by the writer in his position as Geographer for the Toledo Chamber of Commerce.

imately 450 units daily.

Section 4. Great Lakes Waterway

Toledoans call their city the "Pivot City of the Great Lakes." Perhaps such an ambitious phrase raises a question among Detroiters, but if both industry and lake traffic are considered Toledo has a strong claim to its adopted title. In addition to its excellent geographic and economic location, the physical conditions of the port are among the best on these lakes which carry the world's heaviest inland water commerce. As a result, the port of Toledo "is one of the most important bulk commodity ports on the Great Lakes, considered both from the standpoint of its handling facilities and its volume of traffic."¹ Many writers have recognized the outstanding qualities of the port, but opinions vary on the potency of this asset in the development of Toledo.²

How does the port serve Toledo? From the standpoint of employment the port contributes little. In 1940, only 335 persons were employed in water transportation.³ If figures were available for the number employed at the various docks, they undoubtedly would be small. This arises from the nature of the commerce. Efficient mechanical equipment for handling the various bulk commodities keeps manpower needs to a minimum. Increases in traffic only mean steadier use of the port facilities. Nor does the waterway provide a site for extensive recreation facilities. Hence Toledo's major benefits from her waterway are not gained directly. Instead the chief employment value accrues from the industries which have located in Toledo partially to take advantage of the waterway (Figs. 15 and 24). Added to this are the terminal facilities for handling the bulk traffic to the port. Outstanding is the heavy rail traffic of coal. Shifting the nu-

¹U. S. Army, Corps of Engineers, Board of Engineers for Rivers and Harbors, The Port of Toledo, Ohio, Lake Series No. 7, p. 5.

²Various studies such as Griffenhagen's Toledo Port Survey of 1928 and the Toledo and Lucas County Plan Commissions' What About Our Future? have pointed out the incomplete utilization of this great natural advantage. A commendable article on the port and its facilities and commerce is Walter G. Lezius, "The Lake Port at Toledo," Economic Geography, XII (April, 1936), 197-204.

³Sixteenth Census of the United States: 1940. Population, Vol. III, Part IV, p. 766.

merous cars requires considerable labor. Recent petroleum terminal developments also have added to this need. A less tangible value, but one of some significance, is the prestige gained by the city. As the world's greatest coal shipping port and as the fourth port in tonnage in the United States, Toledo has found additional recognition. Nevertheless, the potentialities of the port have yet to be realized fully. Many feel that the creation of a port authority will be an important step in attaining this desired goal.

The Port and Its Facilities

Regardless of the present benefits of the waterway to employment in Toledo, the strategic location of the port on the navigable waters of the lower Maumee River at the head of Lake Erie contributed greatly to the city's earlier growth. The port facilities, added in recent years, have provided the force to maintain this situational advantage.

The natural depth of the river channel was adequate for nearly all vessels until approximately 1866.¹ However, where the river broadens in its lower course, the channel follows the right or east bank (Fig. 15). This has affected the utilization of the two shores. Although channels easily can be dredged through the silt bottom, industry has chosen sites chiefly along the deeper east side.

A major cause for the failure of the early river-mouth town of Manhattan was the inadequate depth along the west shore. In contrast, Toledo had its start where the narrowest portion of the lower river course occurs. Better scouring here allowed both shores to be used.

The Toledo harbor has a channel 23.5 miles long and 25 feet deep.² The distance from deep water (25 feet), through the shallow bay, to the mouth of the river accounts for 16.5 miles of the total.³ Here the width is 500 feet. The remaining 7 miles

¹In 1866, the first appropriation for improvement of the harbor was made. A lighthouse had been erected in 1831 (Waggoner, op. cit., pp. 460-61).

²See U. S. Lake Survey, Toledo Harbor, Ohio, Catalogue No. 374, June, 1946.

³Midway along this section of the channel is Toledo Harbor Light. The waters of the bay average approximately 18 feet in depth in this area.

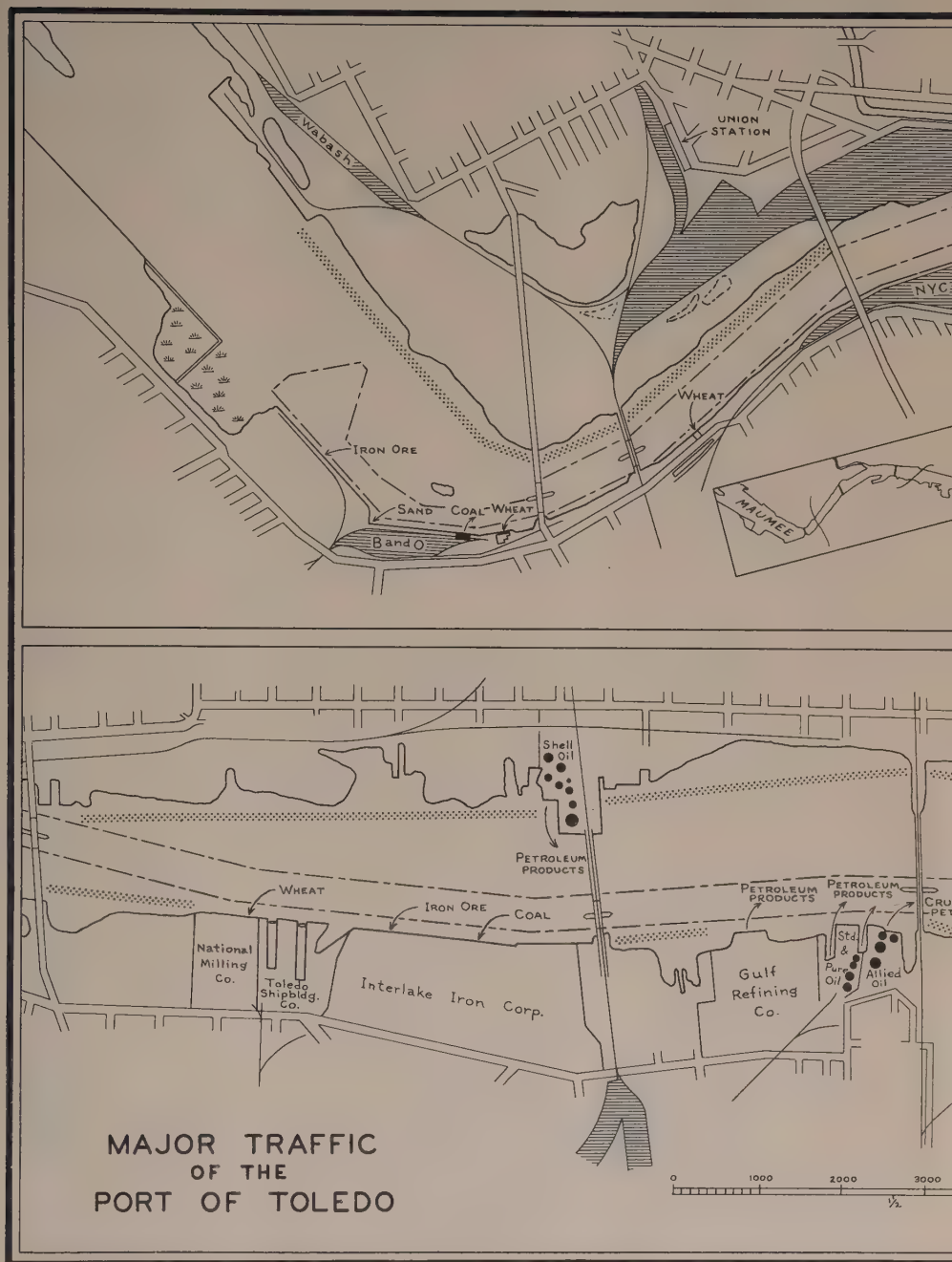
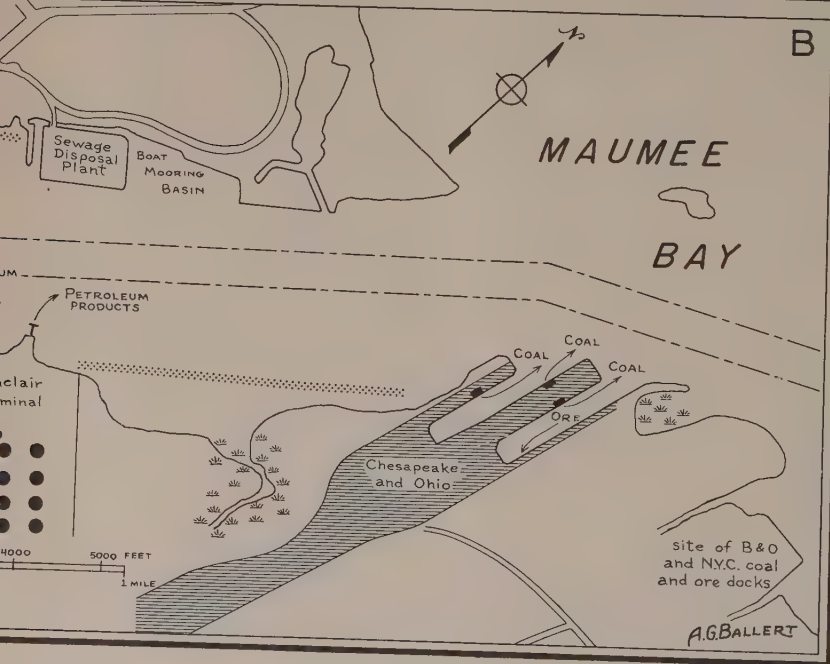
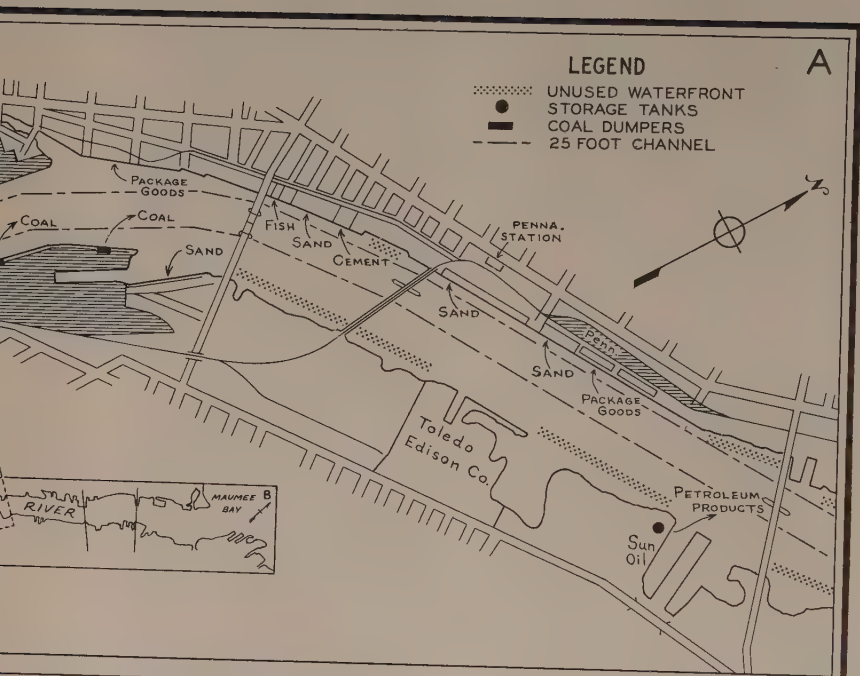


Figure 15



above the river mouth is 400 feet wide.¹ No distinct bars form in the channel, but the bay section is subject to considerable fill each year. This is caused largely by northeast storms which carry silt from the shallow bay into the channel.² Little alluvial material is brought down by the slow-flowing Maumee.

Until recent years, ice jams caused the occasional flooding of Water Street adjacent to the Central Business District.³ By deepening the channel to give a satisfactory right-of-way for the ice and by using tugboats to prevent jams, this problem has been removed.

The average open season, from February 21 to December 20, is forty-seven days longer than that of any other port on Lake Erie.⁴ References to this important fact will be made later in this chapter.

Nearly all of the terminal facilities for loading and discharging bulk commodities are localized along the east bank of the Maumee (Fig. 15).⁵ Here the shore line is low, and considerable marshland has been filled in the last score of years. In fact, the sites of the coal docks are largely on made land.⁶

In addition to the six huge coal dumpers on the right bank, there are eight traveling ore unloaders, three grain eleva-

¹The head of navigation for boats having a 5-foot draft is Perrysburg, 6 miles upstream from end of the government channels.

²Approximately \$150,000 are spent yearly in maintaining the channel to Toledo. Interview with Mr. J. C. Lasplisa, U. S. Harbor Engineer, Toledo.

³The last flooding of this area was in 1918.

⁴Following Toledo is Sandusky with average opening and closing dates of March 28 and December 8. At Buffalo the season is from April 11 to December 23 (U. S. Lakes Survey Office, op. cit., pp. 369, 410, 415).

⁵For a detailed account of facilities of the port see U. S. Army, Corps of Engineers, Board of Engineers for Rivers and Harbors, The Port of Toledo, Ohio, Lake Series No. 7, 1939. For comparison with other lake port facilities use Transportation on the Great Lakes published in 1937 or Port and Terminal Facilities at the U. S. Ports on Lake Erie, Lake Ontario, and the St. Lawrence River: 1943 published in 1945, both by the U. S. Army, Corps of Engineers.

⁶For a discussion of the coal traffic of the port see pp. 90-98.

tors with a combined storage capacity of 8,400,000 bushels, and six of the port's seven petroleum terminals.

On the west bank riparian use, as previously suggested, is largely in the central part of the city. Little mechanical equipment is used here. Among the waterfront facilities are several storage warehouses, a cement storage elevator, the seventh petroleum terminal, and several wholesale fish docks. Sand, gravel, and similar cargoes are handled by cranes and derricks at a number of builders supply docks on both sides of the Maumee and along the lower course of tributary Swan Creek.

The bulk terminals along the river are migrating lake-ward.¹ The Chesapeake and Ohio's coal and ore docks, built at the mouth of the river in 1930, were the start of this trend. The petroleum terminals, which largely have developed since this time, are nearby. The shift of the New York Central and Baltimore and Ohio coal docks to the bay front by 1948 will complete this movement. This will eliminate passing through seven bridges required to reach the latter company's present terminal. Other handicaps to upstream locations are strong currents in the spring and occasional crosswinds. These conditions necessitate the use of tugboats with a resulting increase in cost of operation.²

The early opening date of the port makes Toledo an attractive winter haven for lake vessels. A small winter mooring basin is available, but many vessels tie up along the river channel and at the coal docks. Some of these vessels frequently provide storage space for lake grain through the winter.³

¹For early suggestions and plans for a port development on Maumee Bay see Port Study, A Report by Harland Bartholomew (Toledo: Port Commission, 1924), p. 47 and Plate 21 and Toledo Port Survey of 1928, op. cit., p. 13.

²This charge is minor compared to the costs for moving five miles up the Cuyahoga River at Cleveland. Until improvement of the crooked channel in 1940, the cost of a round trip over this distance varied between \$1,200 and \$1,500 (E. W. Miller, "Cleveland--A Great Lake Port," Scientific Monthly, LIX (September, 1944), 184. The alterations have not lessened markedly Cleveland's inner harbor problem.

³During the winter 1945-46, fifty-five lake steamers and one tanker were moored in Toledo (From U. S. Harbor Engineer, Toledo). Of this number, thirteen were used for the storage of 4,051,281 bushels of grain. The total U. S. registry for principal lake bulk freight carriers other than tankers is 340. Derived from Annual Report of the Lake Carriers' Association, 1945 (Cleveland: Lake Carriers' Association, 1946), pp. 47, 48, 95.

The American Shipbuilding Company provides additional attraction for the port. Two graving docks can accommodate the largest vessels on the Great Lakes. This especially is advantageous, as repairs usually are made at the end of a trip.¹

All of the major wharves have rail spurs which join main railroads or connect with the Toledo Terminal belt line. Some citizens believe this facility to be more than adequately supplied. Ownership by the railroads of more than half the waterfront is the basis for this contention (Table 7). Despite this fact, much non-railroad land having riparian advantages lies idle (Fig. 15). The bayward trend of port development may aid in alleviating the controversy on waterfront ownership.

TABLE 7

OWNERSHIP AND DEVELOPMENT OF THE TOLEDO WATERFRONT*

Owner	Linear Feet	Per Cent of Total	Linear Feet Developed	Per Cent of Total
City of Toledo	9,345	10.72	980	1.12
Railroads	47,400	54.38	20,000	22.94
Local interests	30,430	34.90	14,550	16.69
Total	87,175	100.00	35,530	40.75

*U. S. Army, Corps of Engineers, Board of Engineers for Rivers and Harbors, The Port of Toledo, Ohio, Lake Series No. 7, p. 8.

Commercial Aspects of the Port

As a bulk terminal, Toledo is preëminent among American ports.² Again her particular situation at the southwesternmost

¹Cf. Edward L. Ullman, Mobile: Industrial Seaport and Trade Center (Ph.D. dissertation, Dept. of Geography, University of Chicago [Chicago: Private edition, Distributed by the University of Chicago Libraries, 1943]), p. 126.

²Only three U. S. ports surpassed Toledo in tonnage in 1940. In thousands of short tons they were (1) New York, 65,423; (2) Duluth-Superior, 54,128; Philadelphia, 31,065. The total for Toledo was 28,094 short tons. This year was chosen as the latest date before the distorting effects of the war (U. S. Bureau of the

reaches of Lake Erie prompts commercial development. It is a generally recognized fact that for bulk commodities transportation is cheapest by water.¹ At the head of Maumee Bay, Toledo provides the greatest benefit from this service for a number of products and a broad hinterland.

All of the major commodities carried on the Lakes--ore, coal, grain, stone products, and petroleum products--move through the port of Toledo.² However, receipts and shipments differ greatly as do the tonnages of the various commodities. In 1945, the port handled 30,568,366 net tons, all bulk cargo. Of this total, outbound was more than five and one-half times in excess of inbound as Table 8 shows.³ In addition, nearly one-half million tons of coal and oil were used for bunker fuel. The major commodities handled through the port are shown in Table 9.

Bituminous coal has led in the total commerce of the port as well as in the shipments throughout the twentieth century (see Table 2). Its relative importance continued to increase, until in 1930 it accounted for 99 per cent of all shipments or 81 per cent of the total commerce. Since that time, the lake traffic in

Census, Statistical Abstract of the United States, 1943 [Washington: Government Printing Office, 1944], pp. 481-82).

Larger figures, especially for New York, are given in New York Marine News Co., Inc., Deep Water (Plainfield, New Jersey: Recorder Press, 1943). Apparently all local traffic has been included in this data.

The most comprehensive study of the commerce of a Great Lakes port is Richard Hartsorne's "The Lake Traffic of Chicago" (Unpublished Ph.D. dissertation, Dept. of Geography, University of Chicago, 1924).

¹In September, 1946, the water rates for coal to Duluth and for iron ore from that port to Toledo were 51 cents per ton for the former commodity and 90 cents for the latter. Letter from Mr. R. H. Smith, Traffic Commissioner, Duluth Chamber of Commerce, September 4, 1946.

²In 1945, the total number of vessel trips inbound at Toledo Harbor was 5,378 according to the U. S. Engineer Office, Detroit. A figure of 4,626 lake vessel arrivals is given by the U. S. Harbor Engineer at Toledo for 1945. The latter total indicates only the major lake carriers which entered the port.

³A survey of the lake bulk carrier arrivals and departures in October, 1946, one of the heaviest months on record, explains this unbalanced condition. Of the 654 arrivals, 583 or 89 per cent were empty. In contrast, only 25 vessels (4 per cent) departed light, while 474 (73 per cent) carried coal and 143 (22 per cent) were laden with petroleum products. From MS record of U. S. Harbor Engineer, Toledo.

petroleum products has developed.¹ In 1945, bituminous coal accounted for 86 per cent of the outbound tonnage (73 per cent of total commerce) and petroleum products for 13.9 per cent. This especially is significant, as the volume of coal shipped had increased by six and one-half million tons between 1930 and 1945. Coal and petroleum products make up the entire export to Canada. Due to the importance of the coal shipments, it is given greater consideration later in this section.

TABLE 8
LAKE TONNAGE AT TOLEDO: 1935, 1940, AND 1945^a

Traffic	1935 ^b Net Tons	1940 ^b Net Tons	1945 ^b Net Tons
Receipts	2,537,326	2,772,291	4,478,002
Lakewise and Coastwise	(2,360,579)	(2,689,615)	(4,382,323)
Imports	(176,747)	(82,676)	(95,679)
Shipments	16,617,251	24,927,243	25,554,691
Lakewise and Coastwise	(14,843,056)	(20,847,381)	(20,192,968)
Exports	(1,774,195)	(4,079,862)	(5,361,723)
Total	19,154,577	27,699,534 ^c	30,032,693
Bunker:			
Coal	362,541	457,036	414,896
Fuel oil	8,129	.....	22,841
Local	106,388	245,326	97,936
Grand Total	19,631,635	28,401,896	30,568,366

^aData for 1935 from U. S. Army, Corps of Engineers, Board of Engineers for Rivers and Harbors, The Port of Toledo, Ohio, Lake Series No. 7, pp. 88-93. Data for 1940 and 1945 from MS records "Toledo Harbor, Ohio," U. S. Engineer Office, Detroit.

^bFigures in parentheses are sub-parts of the total receipts and shipments.

^cFigure differs from n. 2, p. 83, largely because bunker coal has been subtracted. Nevertheless, a minor discrepancy would appear. The writer believes the figures in the above table to be most authoritative.

¹Cf. James T. McBroom, "Petroleum Transportation on the Great Lakes" (Unpublished Master's thesis, Dept. of Geography, University of Chicago, 1939), p. 1.

TABLE 9

PRINCIPAL GROUPS OF COMMODITIES HANDLED AT THE
PORT OF TOLEDO, 1940 AND 1945^a
(Net Tons)

Commodities	1940		1945	
	Receipts	Shipments	Receipts	Shipments
Coal and coke	288,093	22,318,926 ^b	453,277	21,962,794 ^b
Iron ore	2,059,054	.....	3,324,460	.....
Stone products ^c	357,763	23,966	240,204	26,090
Petroleum products	550	2,524,069	54,833	3,549,444
Grain	36,972	.....	405,228	10,795
Iron and steel	5,360	51,816	.....	5,568
Other	24,499	8,466	.....	.....
Total	2,772,291	24,927,243	4,478,002	25,554,691

^aCompiled from MS records "Toledo Harbor, Ohio," for 1940 and 1945, U. S. Engineer Office, Detroit.

^bBituminous coal amounted to 22,308,005 tons in 1940 and 21,945,461 tons in 1945. Bunker coal is not included.

^cIncludes cement and flue dust.

The chief petroleum products shipped from Toledo are crude, gasoline, and fuel oil. A position very similar to the East Chicago-Whiting district--at the head of one of the lower lakes with a number of refineries and pipe line terminals--results in Toledo ranking second as a lake shipper of petroleum products. Since 1937, shipments have exceeded receipts. The Toledo shipment of crude oil surpasses that of all other Great Lake ports, and the fuel oil shipments are a close second to those of Indiana Harbor.¹ Crude petroleum is shipped almost in its entirety to Canada, while gasoline, fuel oil, et cetera find their major mar-

¹In 1945, the crude oil shipments from Toledo amounted to 1,927,550 net tons, and the fuel oil shipments from Toledo and Indiana Harbor were 551,522 and 576,153 net tons respectively. Letter from Mr. E. W. Nelson, War Department, Office of Division Engineer, Great Lakes Division, Chicago, May 27, 1946.

kets at Cleveland, Detroit, and Buffalo.

The principal commodity received at Toledo is iron ore. Stone products, coal, and grain provide most of the remaining receipts. Since 1940, all except stone products have shown a marked increase (Table 9).

Iron ore contributed 74 per cent of the inbound tonnage or 11 per cent of the total commerce in 1945 (Tables 9 and 10). The entire amount came from the Lake Superior ore region. Among the ore receiving ports of the Great Lakes, Toledo ranks ninth.¹ This low relative position results from the small ore-consuming ability of Toledo and its hinterland. Of the total tonnage received at the port in 1945, about 29 per cent or 963,200 short tons were consumed locally. The remainder was distributed almost entirely to southern Ohio.² The minor importance of this area in comparison with the Pittsburgh-Youngstown interior area explains Toledo's power to intercept but a small portion of the eastbound ore cargoes.

As a single commodity, bituminous coal provides the second highest source of receipts. Normally the entire tonnage originates at Sandusky, Toledo's major competitor in coal shipping. The receipt of this commodity, indeed, appears paradoxical. An explanation is given later in this section.

Stone products--molding sand, Portland cement, quartzite, et cetera--recently have been surpassed by coal in volume of receipts (Table 9). The stone products are used chiefly by local industries. Molding sand comes from the east shore of Lake Michigan, Portland cement entirely from Alpena, Michigan,³ and quartzite from the Georgian Bay area of Canada. Sand, dredged from Maumee Bay and Lake Erie, makes up most of the local tonnage of the port.

The various grains comprise the final important group of

¹Annual Report of the Lake Carriers' Association, 1945, pp. 55, 56.

²The percentages shipped to the various areas were (1) Ironton district, 10.5; (2) Hamilton and Middletown, 29.6; (3) Jackson, Ohio, 31.2. Iron ore figures based on data in letter from Mr. H. M. Ronk, The Lake Superior Iron Ore Association, Cleveland, Ohio, May 10, 1946.

³Cf. P. C. Morrison, "Cement Production and Trade on the Great Lakes," Economic Geography, XX (January, 1944), 37-53.

TABLE 10
COMMODITIES AND VOLUME OF WATER TRAFFIC
AT TOLEDO, 1945 (NET TONS)*

Commodities	Total	Canadian	
		Imports	Exports
Wheat	372,278	.....	.....
Oats	39,965	9,473	.....
Barley and rye	3,780	.....	.....
Animal products	843	.....	.....
Bituminous coal	22,398,738	.....	3,356,798
Coke, by-product	5,850	.....	5,850
Coke, petroleum	11,483	.....	11,483
Iron ore	3,324,460	.....	.....
Gravel	12,743	6,104	.....
Sand, building	148,763	59,916	.....
Sand and gravel	1,607	.....	.....
Quartzite	20,186	20,186	.....
Petroleum, crude	1,927,550	.....	1,923,498
Dolomite	26,090	.....	.....
Sand, molding	94,228	.....	.....
Distillate	31,720	.....	.....
Gasoline	1,059,325	.....	62,019
Kerosene	26,238	.....	.....
Oil, fuel	551,522	.....	2,075
Oil, gas	7,922	.....	.....
Pig iron	5,568	.....	.....
Portland cement	44,995	.....	.....
Flue dust	14,775	.....	.....
Total	30,130,629	95,679	5,361,723

*From MS record "Toledo Harbor, Ohio - 1945,"
U. S. Engineer Office, Detroit, Michigan.

TABLE 10 - Continued

Coastwise Shipments via Oswego	Lakewise		Internal Shipments		Local
	Receipts	Shipments	via Buffalo	via Oswego	
.....	361,483	10,795	.....	.....	.....
.....	30,492	.....	.....	.....	.....
.....	3,780	.....	.....	.....	.....
.....	.....	.....	.....	.....	843
.....	453,277	18,588,663	.....	.....	.....
.....					
.....					
.....	3,324,460	.....	.....	.....	.....
.....	.....	.....	.....	.....	6,639
.....	.....	.....	.....	.....	88,847
.....	.....	.....	.....	.....	1,607
.....					
4,052	.....	.....	.....	.....	.....
.....	.....	26,090	.....	.....	.....
.....	94,228	.....	.....	.....	.....
.....	.....	31,720	.....	.....	.....
.....	54,833	940,679	.....	1,794	.....
.....	.....	26,238	.....	.....	.....
.....	.....	543,724	5,723	.....	.....
.....	.....	7,922	.....	.....	.....
.....	.....	5,568	.....	.....	.....
.....	44,995	.....	.....	.....	.....
.....	14,775	.....	.....	.....	.....
4,052	4,382,323	20,181,399	5,723	1,794	97,936

products received. However, the 1945 receipt of 361,483 short tons of wheat was far above normal.¹ The major points of origin for the grains are Fort William-Port Arthur and Duluth-Superior.

Commerce with areas outside of the Great Lakes region is small. Overseas imports and exports via the St. Lawrence amounted to a few thousand tons before the war. Among the items in this trade, only imported woodpulp was significant. The same product also was the only one worthy of mention from the St. Lawrence section of Canada. The minor traffic via the New York State Barge Canal is largely sugar westbound and petroleum products to the east.

World's Leading Coal Port

Toledo is the world's premier coal port and America's greatest coal exporting port. This significant fact is based upon comparison with such world renown coal shipping centers as Britain's Newcastle area on the Tyne River and Cardiff area on the Bristol Channel,² Germany's Duisburg-Ruhrort area on the Rhine, and America's Hampton Roads area near the entrance to Chesapeake Bay (Table 11). For the port of Toledo to hold first position in coal shipping with the major sources of this commodity over 300 miles away is a fact worthy of special comment.

¹The total bushels of wheat and oats received via lake in 1945 were 12,065,050 and 2,463,020 respectively (Annual Report of the Lake Carriers' Association, 1945, p. 81). This was the greatest amount ever received by vessel at Toledo and probably resulted from the shortage of rail facilities. The high figure was induced partially by the increased activity in Commodity Credit Corporation wheat for export. The total receipt of wheat at Toledo by rail and water in 1945 was 33,284,840 bushels (Toledo Board of Trade).

²The two British areas mentioned above have been recognized so widely as the world's principal coal shipping centers that it is well to note the changes in volume of coal shipped from the coastal zones in which these ports are located. The domestic and foreign shipments of cargo coal are as follows: Northeast Coast (Tyne, Blyth, Wear, and Tees), 1923--35,706,861 short tons, 1938--29,263,929 short tons; Bristol Channel (Cardiff, Swansea, Newport, Bristol and others), 1923--35,944,235 short tons, 1938--19,324,490 short tons (The Colliery Year Book and Coal Trades Directory, 1946 [London: Louis Cassier Co., 1946], pp. 618-19). The decreases in coal shipments between 1923 and 1938 occurred entirely in exports. In the Northeast coastal area, for example, the foreign shipments were reduced from about 28,500,000 short tons to 13,500,000 short tons.

TABLE 11

LEADING COAL SHIPPING PORTS AND AREAS OF THE WORLD^a
(Tons of 2,000 lbs.)

Ports	Domestic	Foreign	Total	Bunker
Toledo (Avg. 1935-39)	16,560,315	2,153,930	18,714,245	401,223
Newcastle, England (1935) ^b	4,792,697	7,413,893	12,206,590	1,507,372
Cardiff, Wales (1936) ^c	1,409,343	7,701,471	9,110,814	1,910,565
Duisburg-Ruhrort, Ger. (1937)	.....	.....	18,528,745	.....
Hampton Roads, Va. (Avg. 1935-39) ^d	17,200,793	891,518	18,092,311	806,795
Sandusky, Ohio (Avg. 1935-39)	7,137,250	653,222	7,790,472	190,203

^a Computations for Toledo, Hampton Roads, and Sandusky are from U. S. Army, Annual Report of the Chief of Engineers, Part 2, 1936-40; British data is converted from long tons in Analysis of Goods Imported into and Exported from The Tyne, 1935 (Newcastle-upon-Tyne: Tyne Improvement Commission, 1936), p. 20 and The South Wales Coal Annual, 1937 (Cardiff: The Business Statistics Co., Ltd., 1937), p. 29; Duisburg-Ruhrort data is converted from metric tons as given in Statistisches Reichsamt, Wirtschaft und Statistik, Vol. XVIII, No. 4 (Berlin: Verlag für Sozialpolitik, Wirtschaft und Statistik, 1938), p. 147.

Prewar tonnage data are used, as more recent figures for U. S. ports would place European areas at a disadvantage.

All U. S. figures are for bituminous coal only, as coke and anthracite coal are negligible in amount; the Duisburg-Ruhrort total includes lignite.

^b Includes North and South Shields.

^c Includes Penarth and Barry.

^d Includes Norfolk and Newport News.

In 1945, Toledo shipped 21,945,461 net tons of bituminous coal.¹ This was 40 per cent of all coal or 41 per cent of the

¹ The primary sources for U. S. statistics on Great Lakes coal shipments are provided by the U. S. Engineer Office, Detroit and the Ore and Coal Exchange, Cleveland. Although the data for the two organizations are different due to the method of obtaining the information, the variation is so slight as to be of no relative importance. For comparisons, the Ore and Coal Exchange statistics are used as they are published far more promptly. The Exchange's

bituminous coal shipped from Great Lake ports.¹ The distribution of this commodity among the various sections of the Great Lakes is shown in Table 12. Although Toledo is also the leading port for export coal, her dominance here is somewhat less.² The location of Canada's major manufacturing and population centers on and about the western end of Lake Ontario means that Toledo is at a disadvantage in shipping coal to these Canadian points.

Since 1914, Toledo has been the largest coal shipping port on the Great Lakes.³ The introduction of huge coal dumping machines to the port at about this time greatly aided this development. Coal docks were established soon after the opening of rail lines from southeastern Ohio, but it was not until 1909 that the first coal dumper was erected by the New York Central.⁴ In 1914 and 1915, the Hocking Valley and the Baltimore and Ohio installed similar equipment. Later the New York Central added another dumper. With the acquisition of the Hocking Valley facilities by the Chesapeake and Ohio, new coal docks were built in 1930 at Presque Isle, a site at the mouth of the Maumee (Fig. 16). This semi-island had been a resort in the 1880's, and during World War I a government nitrate plant was erected here. Later by filling in the marshland, the island became a peninsula. The docks now located here ship more coal than any Great Lakes port. They accounted for about 68.5 per cent of Toledo's total in 1945. In

data also is published in the Annual Report of the Lake Carriers' Association and in Saward's Annual.

¹Total bituminous coal shipped in 1945 from all Great Lakes ports was 53,670,837 net tons. The total anthracite coal shipped was 1,575,360 net tons (Annual Report of the Lake Carriers' Association, 1945, p. 11).

²In 1945, the total lake shipment of bituminous coal from all United States ports to Canada was 14,719,046 net tons. Of this amount, 3,356,798 tons or 22.8 per cent was from Toledo. Figure for total shipment in letter from Mr. E. W. Nelson, op. cit

The United States exports of bituminous coal to Canada in 1945 were 21,578,281 net tons. Thus about 15.5 per cent of the total or nearly one-sixth passed through Toledo. Computed from U. S. Bureau of Mines, "International Coal Trade," Vol. XV, No. 2 (Washington: Bureau of Mines, February 28, 1946), p. 16. (Mimeographed.)

³Cf. Sydney A. Hale, The Coal Trade, 1920 (New York: Estate of F. E. Saward, 1920), pp. 97-98.

⁴Chamber of Commerce Journal, May, 1925, p. 5.

TABLE 12
SHIPMENTS OF BITUMINOUS COAL FROM TOLEDO TO VARIOUS GREAT LAKES DISTRICTS, 1945^a

Lake Districts	Weight in Net Tons			Per Cent of Total	
	United States Ports	Canadian Ports	All Ports	From Toledo	From Toledo of all Lake Erie Shipments
To Lower Rivers	5,377,880	484,325	5,862,205	26.8	64.0
To Lake Michigan	6,901,277	125,484	7,026,761	31.5	45.6
To Lake Superior	4,603,474	1,434,749	6,038,223	21.6	43.0
To Sault	408,923	1,191,054	1,599,977	8.4	73.8
To Lake Huron	1,015,797	498,416	1,514,213	5.5	39.0
To Lake Erie	253,337	624,798	878,135	3.4	15.5
Through Welland Canal	.....		624,798	2.8	14.8
Total	18,560,688	3,358,826	21,919,514 ^b	100.0	43.9

^aSource: Computations from statistics in the Annual Report of the Lake Carriers' Association, 1945, p. 67.

^bOn page 65 of the above publication, the total was given as 21,950,060 tons. Both differ from the previously mentioned U. S. Engineer Office figure of 21,945,461 tons. None of the totals include bunker coal which amounted to 414,896 tons.



Figure 16. Airlview of the Chesapeake and Ohio Coal and Ore Decks and Car Storage Yards.

addition to loading three vessels simultaneously, there is dockage for seventeen others.¹ As previously mentioned, there are three ore unloaders at these docks. When the new Baltimore and Ohio and New York Central docks are completed on the adjacent bayfront property, this small area will be the world's greatest coal shipping point.² However, after this change none of the loading facilities will be located within the city (Fig. 1).

Numerous geographic and economic factors have contributed to the coal shipping position of Toledo.³ The outstanding ones are as follows:

1. Change in the sources of coal and coke.--The major sources of bituminous coal for lake shipment and vessel fuel have shifted from the Northern to the Middle Appalachian fields in recent years as is shown by the following percentages: Pennsylvania and Ohio, 59.5 (1917), 32.8 (1929); southern West Virginia and eastern Kentucky-Tennessee, 36.9 (1917), 63.0 (1929).⁴ The by-product method of coke-making eliminated the need for using one grade of coal, namely that from the Connellsville district of

¹Interview with Messrs. Riley and Hoy of the Chesapeake and Ohio docks, Toledo. A coal dumper can handle about fifty cars per hour.

²At most of the ports mentioned in Table 11, the loading docks are more widely distributed. Examples are Hampton Roads, where Norfolk and Newport News are considered as one area, and Cardiff, Wales, where Barry and Penarth also are included.

³Cf. R. E. Murphy and H. E. Spittal, "Movements of the Center of Coal Mining in the Appalachian Plateaus," Geographical Review, XXXV (October, 1945), 627-29.

⁴W. G. Fritz and T. A. Veenstra, Regional Shifts in the Bituminous Coal Industry, University of Pittsburgh Bureau of Business Research Monograph No. 4 (Pittsburgh: University of Pittsburgh, 1935), pp. 71, 72. In 1945, the respective percentages were 27.1 and 64.7. Computed from U. S. Bureau of Mines, "Survey of the Bituminous Coal and Lignite Industry in 1945," No. W.C.R. 1504 Supplement (Washington: Bureau of Mines, 1946), p. 15.

Among the conditions facilitating the Middle Appalachian development were (1) available rail facilities seeking new business as timber resources were becoming exhausted; (2) lower freight rates, taxes, and living costs than in the northern fields; (3) generally thicker coal seams than in the northern fields; and (4) local industries requiring but a small portion of the total coal mined thus leaving most of it to be shipped out of the area. See H. C. Mansfield, The Lake Cargo Coal Rate Controversy (Ph.D. dissertation, Dept. of Political Science, Columbia University [New York: Private edition, Columbia University, 1932]), pp. 7, 37-38.

Pennsylvania. The new method permits the mixing of low and high volatile coals of the Middle Appalachian fields.¹

2. Accessibility to Middle Appalachian fields.--Topography and shortness of route directs coal toward Toledo. Rail lines through the dissected Appalachian Plateau in most instances follow the courses of least resistance, namely the valleys. The major route to Lake Erie is via the Kanawha, Ohio, and Scioto valleys. This leads on to the Lake Erie plain in which Toledo and Sandusky are the only major ports.²

3. Large number of rail facilities.--Toledo as a major rail center has the greatest number of rail routes from the Middle Appalachian fields. Besides the Chesapeake and Ohio which is the country's greatest coal road, there are the Baltimore and Ohio, New York Central, and Big Four. In addition, the Norfolk and Western and the Louisville and Nashville bring coal to Columbus and Cincinnati respectively for interchange to the above-mentioned railroads. As Toledo has double the coal dumping equipment of any other lake port, it can handle efficiently coal for all railroads.

4. Encouragement of transshipment at the western end of Lake Erie by favorable rail and water freight rates.--Only Sandusky is on a parity with Toledo for low freight rates from the Middle Appalachian fields. Rail-water rates are lower than all rail rates to many points west and north of Lake Erie, and Toledo is the nearest port to these points.³ Effective January, 1947,

¹Fritz and Veenstra, op. cit., p. 117.

²In 1945, southern West Virginia and eastern Kentucky provided 20,158,544 net tons or 90 per cent of the cargo and vessel fuel coal loadings at Toledo (Letter from Mr. W. H. Young, Assistant Chief, Coal Economics Division, U. S. Bureau of Mines, June 18, 1946). Conversely, about 61 per cent of the coal for lake shipment from the above districts goes to Toledo. Computed from U. S. Bureau of Mines, "Distribution of Coal Shipments," M.C.D. No. 172 (Washington: Bureau of Mines, 1946), p. 3.

³A comparison of freight charges on coal from the Middle Appalachian fields to Detroit and Chicago by rail and by rail-water via Toledo in 1937 shows \$2.60 and \$2.30 respectively to Detroit and \$3.09 and \$2.67 respectively to Chicago. The rail-water cost includes all handling charges (Marion Worthing, "Comparative Assembling Costs in the Manufacture of Pig Iron," Pittsburgh Business Review, VIII [January, 1938], 24).

Illinois and Indiana coal cannot compete with eastern coals at the lake ports--approaching a competitive position only in interior points of southern Wisconsin and Minnesota. Coal for

Rail rates on coal from Middle Appalachian fields were as shown in Table 13. Although receipts are relatively small at Toledo, they greatly surpass Sandusky.¹ For the most economical use of facilities, the lake vessels seek ports which receive as well as ship cargo.

TABLE 13
TRANSPORTATION RATES ON COAL FROM MIDDLE
APPALACHIAN FIELDS, 1947*

Via Rail	High Volatile (domestic)	Low Volatile (coking)
To Toledo (city use)	\$2.79	\$3.04
To Toledo (coal docks)	2.16	2.31
To Detroit	3.00	3.25

*From Chesapeake and Ohio Coal Office, Toledo. Eleven cents a ton is charged for dumping coal into the lake vessels, and approximately forty cents is charged for water transport to Detroit. Some companies have their own vessels. (Rail rates effective January 1, 1947.)

5. Most favorable position with respect to Detroit area (Lower Rivers district).--Although the water rates from all Lake Erie ports to the Detroit area may be the same, Toledo handles nearly two-thirds of the volume of lake coal to this area (Table 12). Two reasons are (a) private bulk freighters such as those of the Ford Motor Company and the Nicholson Transit Company seek the nearest port to allow the greatest number of turn-arounds; (b) River Rouge is the first port after Toledo to open (average date, March 3).² Actually coal moves between these ports throughout the winter.³

the by-product ovens in the Chicago area is moved more economically over the lakes (W. H. Voskuil, "Bituminous Coal Movements in the United States," Geographical Review, XXXII [January, 1942], 121-25).

¹The receipts at Sandusky for the year 1945 totaled 125,510 net tons. Letter from Mr. E. W. Nelson, op. cit.

²U. S. Lake Survey Office, op. cit., p. 360.

³In January and February, 1946, there were twenty-one and eighteen departures respectively of the coal vessel, James Watt.

Unlike Newcastle, coal is shipped by water to Toledo (Table 10). This paradox of transportation is explained by the differential between all-rail and rail-lake rates. By receiving coal via Sandusky at the lake cargo rate plus transportation and handling charges, a saving over the all-rail shipment to Toledo is effected. Thus several hundred thousand tons are received yearly from Toledo's nearest competitor on the lakes--Sandusky. The Interlake Iron Corporation takes the entire receipt which amounted to 453,277 tons in 1945.¹

St. Lawrence Seaway and Ocean Trade

The value of the St. Lawrence Seaway to Toledo long has been a debatable topic.² No complete answer can be given to this question in advance of the opening of the seaway. Even then a full analysis will be difficult due to the many intangible factors to be considered.³

Toledo's location at the western end of Lake Erie makes it the shortest land and water route between all cities west of Lake Erie and European ports. As an example, the all-water distance from Toledo to Liverpool is 3,795 miles as compared with 4,423 miles from Chicago to this British port.⁴ Although Detroit

Over 275,000 tons of coal thus were shipped to River Rouge. Figures from MS record of U. S. Harbor Engineer, Toledo and files of Toledo Chamber of Commerce.

¹This situation has been called "clearly a case of local discrimination." See Lezius, "The Lake Port at Toledo," *op. cit.*, p. 202. However, the ease of emptying a self-unloading freighter at the company dock in comparison to emptying coal cars partially eliminates this disadvantage. The higher charge for coal destined for use in Toledo in comparison with that for shipment from Toledo docks results from the difference in the cost of handling whole trains of coal to one point and routing a few cars for a particular company.

²A poll in September, 1944 by the Toledo Chamber of Commerce in which 41 per cent of the membership replied showed 55.5 per cent favored the Seaway development. In 1939 the trustees of this organization voted to oppose the project.

³Two competent studies on the subject are F. N. Menefee, The St. Lawrence Seaway (Ann Arbor: Edwards Brothers, Inc., 1940) and H. G. Moulton, C. S. Morgan, and A. L. Lee, The St. Lawrence Navigation and Power Project (Washington: The Brookings Institution, 1929).

⁴Toledo is only 295 miles farther than New York from

would be but a few miles farther than Toledo for any ocean vessels plying the Great Lakes, the rail facilities here are less extensive and the territory served by them is much smaller than is the case for Toledo.

Among the pertinent economic questions to be considered in evaluating the seaway in its relation to Toledo are (1) the amount and character of new traffic to the port; (2) the principal sea routes used by ocean vessels calling at the port; (3) competition from other ports, especially on the Atlantic coast; (4) cost of improving the harbor for ocean vessels; (5) length of navigation season for ocean vessels; and (6) inducement for ocean vessels to enter the Great Lakes. In answering the foregoing questions, consideration needs to be directed to the following factors.

1. The volume of the major commodities which now pass through the port of Toledo--coal, ore, and petroleum products--has small prospect of being significantly increased by the proposed seaway. Toledo will receive little benefit from coal shipped overseas from Lake Erie. Ports east of Toledo will receive most of this traffic. The case is similar to Toledo's present poor relative position in this traffic in Lakes Erie and Ontario. Table 12 illustrates this condition. Toledo is more favorably situated for the export of wheat.¹ However, the Lake Superior ports will remain the major transshipment points for this commodity. It appears that the prospects for shipping corn are somewhat brighter. Commodities of a higher unit value are considered in a later paragraph.

2. The North Atlantic route appears to be the principal sea lane to benefit from an improved waterway into the Great Lakes. In the past, Toledo's small overseas trade via the St. Lawrence has been chiefly with countries of northwestern Europe. This traffic--chiefly wood pulp and clay--originated largely in Norway, Sweden and Germany, but its volume was insignificant.²

Liverpool via water. This geographic fact, however, probably has been over-stressed by some Seaway proponents.

Distances given are from Toledo Port Survey of 1928, p. 28.

¹Port Study (Toledo: Port Commission, 1924), p. 33.

²U. S. Army, Corps of Engineers, Board of Engineers for Rivers and Harbors, The Port of Toledo, Ohio, Lake Series No. 7, pp. 89, 98.

Toledo's foreign markets have been chiefly in the less industrialized parts of the world, and the St. Lawrence route appears circuitous for reaching such areas which lie largely in the southern hemisphere or in the Pacific basin. If the Seaway is built, it may prove to be more important as a river and lake highway to eastern Canada than as a sea route.

3. Only a few ports have steamship lines to many parts of the world. Even Boston is at a disadvantage in competition with New York in this respect. For most general merchandise, the longer time and lack of variety of routes will discourage use of the ocean vessels from Toledo.

4. If the St. Lawrence Seaway is developed, the estimated cost of deepening the harbor for ocean vessels is \$2,000,000.¹ To erect a public wharf and waterfront warehouse, it has been estimated that the annual waterborne commerce in general merchandise should be in the vicinity of 100,000 tons.²

5. The length of navigation through the St. Lawrence from Montreal to Lake Ontario will be about seven months.³

6. Ocean vessels must show a profit on operations if they are to be induced to serve the Great Lakes. Special costs affecting such a goal are the higher insurance rates and the need for special pilots while operating in the Great Lakes and St. Lawrence River.

A rating of the relative advantages of various Great Lakes ports has shown Toledo's strongest quality to be the efficiency and convenience of the harbor arrangements.⁴ Although the ability of the city to produce and consume commodities moving by water is not great, her position is most favorable for serving an intensive

¹Interview with U. S. Harbor Engineer, Toledo.

²Toledo Port Survey of 1928, p. 71.

³Menefee, op. cit., p. 41. The number of open days given by Toledo and Lucas County Plan Commissions, op. cit., p. 37 is 234 days. This is an average (1930-43) based on first arrival from sea and last departure for sea at Montreal. It does not account for the 182 miles narrow channel upstream from Montreal. See Dominion Bureau of Statistics, The Canada Year Book, 1943-44 (Ottawa: Edmond Cloutier, 1944), p. 608.

⁴The rating of lake ports was made over twenty years ago, but an evaluation today would show similar results. See Port Study (Toledo: Port Commission, 1924), p. 41-42.

producing and consuming area of the interior portion of the Manufacturing Belt and of the eastern section of the Corn Belt.

Section 5. Pipe Lines

Since the 1880's pipe lines, both petroleum and natural gas, have played an ever increasing rôle in the industrial and commercial development of Toledo. Use of this facility largely is responsible for the city's early growth as a glass and refining center.¹ In this period, the northwestern Ohio field provided an adequate supply of both gas and oil. In fact, each was produced on a small scale within the city limits. The field was exploited lavishly, and lines had to be extended due to the greater need and decreasing reserves in this area (Fig. 17).

Development of the Terminal Function

The natural gas lines were the first to tap distant fields, reaching to central Ohio and later southward into West Virginia.² Here, too, intensive use is resulting in a rapid depletion of the deposits.³ Therefore, in the late 1930's Toledo began supplementing this supply with gas from the Texas Panhandle (Fig. 17).⁴

¹Toledo's first refinery and first glass plant began operations in 1888. The latter industry located here largely as a result of the available gas. Due to Toledo's inferior position with respect to the major gas fields, it did not experience the boom which the smaller towns to the south enjoyed (Geological Survey of Ohio, First Annual Report, by Edward Orton [Columbus: Geol. Survey of Ohio, 1890], p. 147).

²In 1902 Toledo began to receive gas from the field southeast of Columbus. A line was under construction to West Virginia in 1903 (Geological Survey of Ohio, The Occurrence and Exploitation of Petroleum and Natural Gas in Ohio, Bull. No. 1 [4th Ser.; Columbus: Geol. Survey of Ohio, 1903], pp. 44, 115).

³Sugar Grove, southeast of Columbus, Ohio, has been the major field for Toledo's natural gas supply. Not only is this a producing field, but now it is used also as a storage reservoir as a result of the pervious quality of the sandstone. Gas from Texas and West Virginia is pumped into this field during the summer when consumption is somewhat decreased. Interview with Mr. R. S. Wenner, Industrial Manager, Ohio Fuel Gas Company, who contributed much of the technical information about the gas industry in this section.

⁴In the fall, 1946 an attempt to reduce Toledo's allotment of gas from the southwestern fields was blocked. However, the community's increasing dependence on this source of supply,

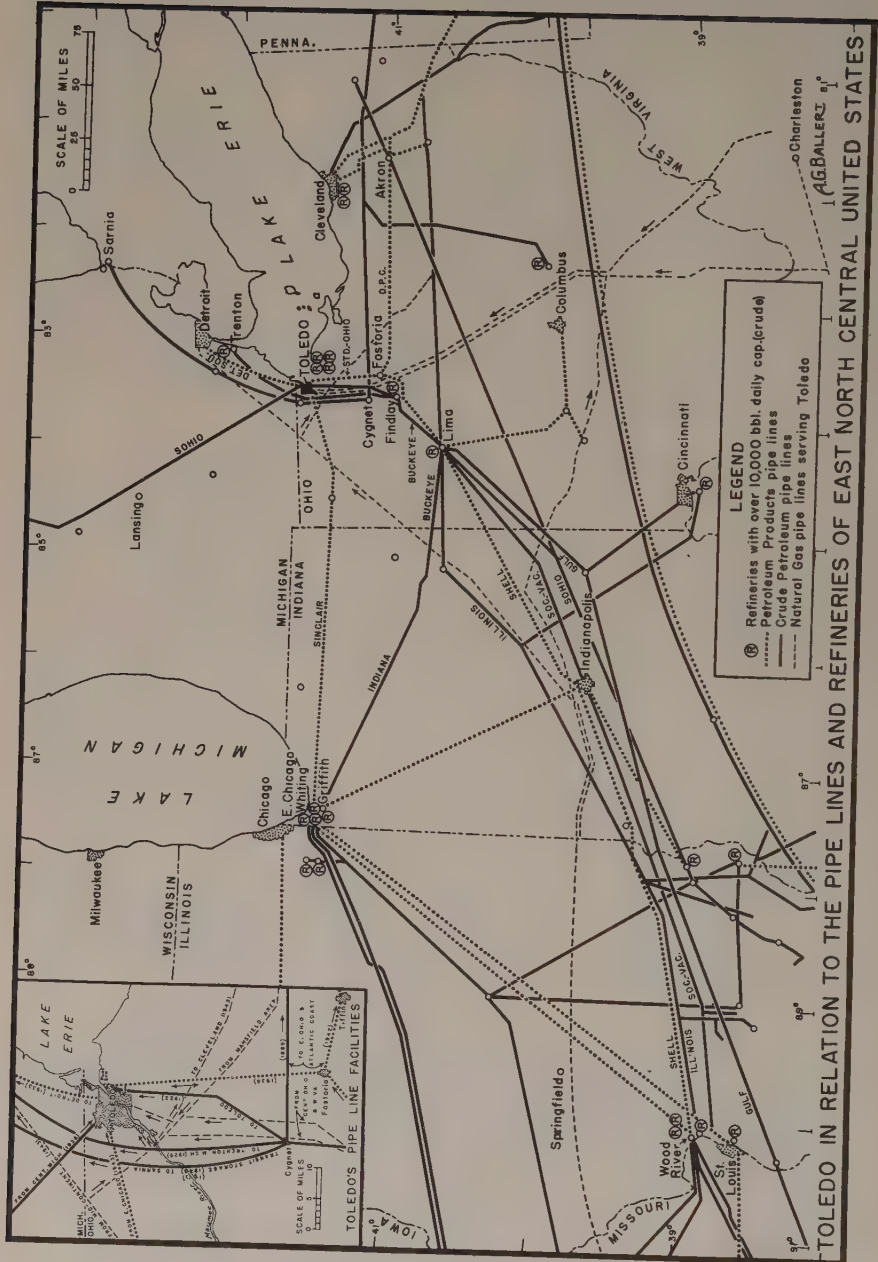


Figure 17

An additional line from the southwest to the Charleston area will assure further Toledo's future needs.

The interstate crude petroleum lines to Toledo have had their development since 1920.¹ In 1896 the Lima oil field, south of Toledo, reached its peak annual production.² Soon the inadequacy of this field to meet the need for greater quantities of petroleum became apparent. Additional supplies were obtained from the Illinois and Mid-Continent fields, first by tank car and later by pipe line.³ The latter transportation facilities from the west focused on Lima, Ohio, about 65 miles southwest of Toledo. From this point, the crude destined for Toledo comes over common carrier lines. In addition there has been a crude line from central Michigan since 1936. However, the high sulphur and salt content of the oil from this area detracts from its desirability and, as a result, Toledo refineries have discontinued using this supply since the end of World War II.

In 1938 the first petroleum products line entered Toledo, and in 1943 the second line was completed.⁴ Toledo's location makes it a natural terminus for such lines from the west for this is the nearest point for transfer to a still lower cost service--the oil tanker.⁵ Petroleum products also are piped from Toledo.

along with many other communities, may develop into an acute problem in the future.

¹The Buckeye Pipe Line Company, the major carrier of crude to Toledo, laid its first line to the city in 1922. Letter from Mr. Frank B. Maullar, Secretary, The Ohio Gas and Oil Association, May 31, 1945. Previous to this time, Sun and Paragon (predecessor of Gulf) used Ohio oil but had their own lines from districts in the Lima field to the refineries.

²Letter from Dr. George W. White, State Geologist, Geological Survey of Ohio, September 20, 1946.

³A survey of the Toledo refiners shows that deposits of southern Illinois are the largest crude source for two of the four companies. New discoveries in this area in 1937-38 have substantially increased production here.

⁴The transportation of gasoline and other liquid products of oil refineries by pipe line was used first in 1930. Although such lines relieve a situation brought about by errors in refinery location, they also threaten to change the location of other such plants. See D. P. Locklin, Economics of Transportation (Chicago: Business Publications, Inc., 1938), pp. 691-92.

⁵See Table 10 for the volume of crude oil and petroleum products shipped from Toledo by lake tanker.

One line extends to the Detroit area. In addition, the Toledo-Fostoria section of another line can have its flow reversed to carry products from Toledo. By connecting at Fostoria with a line to the east, another area is opened to Toledo refineries. Lake tankers, however, provide strong competition for shipments in this direction.

In Table 14 a recapitulation is made of the forementioned pipe lines. The pattern, direction of flow, and construction dates of these facilities in the vicinity of Toledo are shown in the inset of Figure 17.

TABLE 14
PIPE LINE FACILITIES TO TOLEDO

Type of Line		Origin of Line	
Number	Commodity Carried	Number	Field or Refinery
3	crude petroleum	2	Illinois and Mid-Continent fields (six lines of pipe carry the crude to Toledo from the Lima area)*
		1	Central Michigan field (not currently used)
2	petroleum products	1	Wood River, Illinois, refinery
		1	East Chicago, Indiana, refinery
4	natural gas	2	Sugar Grove, Ohio, field
		1	Mansfield, Ohio, field
		1	Texas Panhandle

*Letter from Mr. L. A. Miller, Superintendent, Buckeye Pipe Line Company, September 10, 1945.

Major Features of an Invisible Traffic

Today the entire crude supply needed for Toledo's four large refineries is received by the efficient but unnoticed pipe lines.¹ Petroleum products also are received entirely by these

¹In 1938 crude lines accounted for 97 per cent of the combined rail and pipe line movement of the United States, but for petroleum products only 16 per cent moved by this method. Daggett, op. cit., p. 161.

invisible facilities at the Shell and Sinclair terminals along the Maumee River. Here there is storage capacity for over 35,000,000 gallons of the various petroleum derivatives. In addition, Allied Oil has a crude oil marine terminal which is served by pipe line.

The early advantages which Toledo held due to its proximity to oil and gas are no longer in force. Today for natural gas there is no cost premium for locating industry here since the same rate prevails throughout the territory.¹ Thus earlier conditions account for the location of industries which sought this fuel. A similar fact holds true for petroleum refining. Advantages of lake shipping and the lower cost of piping crude to the market have replaced the value of nearness to producing fields. Without pipe lines Toledo's high rank as a refinery center could never have been attained.²

The recent introduction of products lines are serving to strengthen Toledo's position as a distribution center. This has been accomplished chiefly by lake shipment of these commodities.

The importance of pipe lines to the commerce of Toledo is better realized if the receipts of various commodities carried by this facility are converted into the number of railroad cars which would be required to handle an equal quantity or its substitute.

The transportation of Toledo's daily crude oil needs by rail would require from 420 tank cars of 10,000-gallon capacity during the winter to 620 such cars during the navigation season.

¹Artificial and refiners' gas largely have replaced natural gas in industry. Natural gas is used chiefly for residential purposes. In 1940, 68 per cent of it was used in this manner. This is in contrast to 75 per cent of the total artificial gas which industries used that year. Artificial gas soon will be eliminated for residential usage. The total amount of natural gas consumed in 1940 was 5,671,634,000 cubic feet as against 2,331,138,000 cubic feet of artificial gas. The importance of the glass companies and tool and automotive parts industries in this consumption is revealed in estimates of a recent year when percentages for industrial users were: (1) 43 per cent glass and ceramics, (2) 39 per cent heat treating of metals, (3) 6 per cent foodstuffs, and (4) 12 per cent miscellaneous (Files of Ohio Fuel Gas Company). Refinery gas is an important source of fuel for the glass industry of Toledo.

²Toledo is the largest refinery center between the Chicago area and the New York and Philadelphia areas. See pp. 192-96 for further reference to this activity.

This would mean a minimum of 12,600 tank cars per month.¹

Pipe line receipts of petroleum products during navigation season, when goods can be transshipped, are about 1,010,000 gallons per day or a quantity equal to 3,000 tank cars per month. During the winter, the volume is about half of this amount.²

In 1943, 7,000,000,000 cubic feet of 1,020 B.T.U. natural gas were used in Toledo. This has been estimated by the writer as equal to 382,000 tons of coal per year or 530 cars of 60-ton capacity per month.³

The total of over 14,600 cars per month or 487 cars per day does not infer that this many rail units actually are replaced by the use of pipe lines, but rather it is a measure of the amount of traffic.⁴ However, it is evident that this inconspicuous facility contributes much to the commerce of Toledo. Without it, the rail movement to the city would be augmented greatly, and the efficiency of Toledo's rail terminal function would be jeopardized.

¹The minimum figure is based on daily receipts of 100,000 barrels (42-gallon capacity) of crude at Toledo's four refineries. The Oil and Gas Journal, March 30, 1946, p. 260, gives the capacity of all Toledo refineries as 107,400 barrels per day.

The maximum figure is based on the delivery of 4,358,053 barrels of crude petroleum to Toledo refineries and terminals in October, 1946. Letter from Mr. W. E. Jennings, Oil Traffic Manager, Buckeye Pipe Line Company, November 12, 1946.

²Based on delivery of 744,738 barrels of petroleum products at two terminals and one refinery in October, 1946. The author estimates that about a half is shipped beyond Toledo by tanker.

The line from East Chicago (Sinclair) did not eliminate a rail haul but instead replaced the shipment by tankers around the Michigan peninsula. The distance to Lake Erie by water is 650 miles while by pipe line it is 240 miles.

³The estimate might be based on the number of B.T.U.'s of coal necessary to equal that of the natural gas used or on the amount of coal required to produce an equal volume of gas. Both methods were used, and the mean was taken as the final figure. In calculating the amount of coal necessary to produce the B.T.U.'s equal to that in the gas used, the coal was given an efficiency rate of 80 per cent of the gas. The result is 297,500 tons of coal per year. The second estimate is based on the production of 15,000 cubic feet of gas from 1 ton of coal. This gives a figure of 466,666 tons of coal per year. The result is a mean of 382,000 tons of coal per year. See W. A. Bone and G. W. Himus, Coal--Its Constitution and Uses (London: Longmans, Green and Co., 1936), p. 365.

⁴During the months of high crude and products shipment by lake vessel, as for example October, 1946 mentioned above in nn. 1 and 2, the volume would represent the capacity of approximately 7,500 additional tank cars.

Section 6. Airways

Aviation has not had the spontaneous development in Toledo which has marked the city's rise as a railroad and intercity highway center. This can be explained largely by the special qualities of this new form of transportation. Up to the present, the character of air traffic, largely passenger, has made the great urban centers, hundreds of miles apart, the chief objectives of the routes. As surface features have but minor influence upon the air courses followed in the Central Lowlands, routes between such points have been direct. Intermediate-sized cities, especially those of industrial significance, will become increasingly important in the developing "air-net" as a result of the expansion of scheduled and non-scheduled air transports, shorter flights, private flying, and better airport facilities.¹ Here Toledo's air future appears to be assured, for again the city's central position in the highly developed Lower Lakes region will be a great advantage.

Location and the Development of Ground Facilities

Toledo's position in commercial aviation had an early beginning. It became an important stop on the pioneer commercial air route from New York to Chicago as soon as the Transcontinental Airport opened in 1928. Toledo was a natural stop, as the city lies along the shortest route between these termini.²

The airport, located eight miles southeast of the Central Business District (Fig. 8), was built by a group of the community's business leaders. It was not until 1936 that the city purchased this 513 acre site.³

¹A limiting factor in the development of the air pattern of scheduled services is government regulation. While intrastate routes can be developed with state sanction, the interstate scheduled routes require approval of the Civil Aeronautics Board, whose policy does not permit undue competition of routes.

²The National Air Transport, which operated on this route, merged with three other airlines to become United Air Lines in 1931.

³There are hard-surfaced runways of 3,000, 3,600, and 4,200 feet in length. A government weather station is maintained here. Since the improvements completed in 1941, the airport has been awarded a Class III rating.

Inadequate facilities have affected greatly Toledo's aviation history. In August, 1938, the commercial airlines discontinued their stops in Toledo due to the dangerous condition of the runways.¹ It was not until June, 1941 that this service was resumed. A prime factor in the air future of the city will be the maintenance and expansion of the facilities as the number and size of airliners are increased. Discontinuance of use of the airport for four-engine transports in the fall, 1946 exemplifies the necessity for improving ground facilities.

The proposed site for a Class IV airport is an area of approximately 1,900 acres west of Toledo and northwest of Holland (Fig. 8).² The location is about 11 miles from the Civic Center and would require approximately twenty-five minutes driving time from this point. This site is in the heart of the Oak Openings area, and the physical conditions resulting from the sandy soil together with the distance from the city have given rise to some question regarding the desirability of the location. Whatever site is chosen, several fundamental factors will require consideration, namely the land area available for building, the means of access to the site, and the possible integration of the various transport facilities.

Toledo has two Class I airports located a short distance beyond the corporate limits. These privately operated air fields to the west and north of the city (Fig. 8) were constructed in 1941 (Franklin) and 1942 (National). Both are easily accessible from the major areas of new residential building. Additional fields of the Class I type will be needed with the increase of private planes. Such subsequent facilities might well be located along the southwest border of the city.

Routes and Traffic

At present, three scheduled airlines provide service at

¹In October, 1936, all night stops had been canceled for the same reason. Interesting is the fact that in 1940 the airport showed a profit only as a result of the alfalfa grown on part of the field.

²For an excellent survey of Toledo's present and proposed air facilities see Giffels and Vallet, An Airport Program for the Toledo Transportation Area, Prepared for the Toledo and Lucas County Plan Commissions (Toledo, 1946).

Toledo.¹ The city is on the transcontinental and the Chicago-Washington routes of United Air Lines and on the north-south branch routes of Trans World Airline (domestic) and Chicago and Southern Air Lines. These lines have a total of twenty-eight flights through the city daily. In each direction along the four routes they are (1) United, three Chicago-Washington flights; (2) United, five Chicago-New York flights; (3) Trans World, three Detroit-Cincinnati flights; and (4) Chicago and Southern, three Detroit-Memphis flights.² Each of the airlines has additional flights which do not stop at Toledo. Especially significant in this respect are seventeen flights between Chicago and the Atlantic Seaboard by United. In addition to the scheduled flights, there is a mounting traffic of non-scheduled cargo planes carrying perishable foods and manufactured goods. Most of the former products are incoming, while a major portion of the latter commodities is outbound.

During the first nine months of 1946, 15,468 passengers arrived and 15,051 embarked on commercial transports at the Municipal Airport.³ The heaviest flow is along the east-west route with Chicago the most important objective and Cleveland and New York ranking next.⁴ The short distance to Detroit (55 miles) eliminates most air traffic between Toledo and this terminal point for the two north-south routes.⁵ However, to the south these lines and connecting routes reach an extensive territory. At present, Toledo has a high community of interest with a number of

¹By way of comparison, the number of interstate airlines serving other cities in the region are Detroit--7, Cleveland--5, Cincinnati and Indianapolis--4, Columbus and Dayton--2.

²Taken from October, 1946 published schedules of each company.

³Data obtained from Division of Engineering and Construction, Toledo. There were 103,897 through passengers during this period. Corresponding figures for 1945 show 6,708 inbound, 6,728 outbound, and 68,035 through. Thus the rise in Toledo air traffic in a year was about 127 per cent as against a 53 per cent increase in through passengers. About two-thirds of Toledo's air passengers are carried by United Air Lines.

⁴Based on tabulations from United Air Lines, Local Trend Report Recapitulation for 1942. In files of United Air Lines' Chicago office. (Processed.)

⁵The best train time to Detroit is one hour and twelve minutes as against thirty minutes by plane. The time necessary to get to and from the airports removes this advantage.

cities with which it is not directly connected by air service.

Among the prospective air services for Toledo are (1) a number of feeder routes which show the city as a key point in their systems¹ and (2) additional direct long-distance routes for which applications are pending.

Toledo's Function in the Developing Air Pattern

In considering the rôle of Toledo in the American air pattern, several factors must be taken into account. The ability of the city to support additional services is a certainty. Commercial and industrial enterprises will find increasing use for air transportation. Practically every large Toledo concern either has a nation-wide sales force, and in a number of cases subsidiary plants, or is itself a part of a national organization.² Another major use of air service is for the shipment of goods by air express and freight. The important place of Toledo in the manufacture of products of high value, such as instruments, replacement parts, and dies, gives fine prospects for this type of transportation. The need for rapid service is an important item in such businesses.

An evaluation of the need for air service in the various directions from Toledo brings out several important generalizations. Toledo benefits from any lines destined for Detroit from a southerly quadrant, but it must compete or share with that city when east-west routes are planned. On the latter routes, it would seem desirable to alternate service, Toledo on some schedules and Detroit on the others.³ The close proximity to Detroit which has proven an advantage in industry and land transport will not pre-

¹Richard P. Cooke, "Our Airlines--Today and Tomorrow," reprinted from issues of The Wall Street Journal, New York, 1944.

²Owens-Illinois, Toledo Scales, and Libbey-Owens-Ford are outstanding examples of the former group. Owens-Illinois alone has seventy-seven branch sales or service offices and twenty plants in the U. S. and Canada.

Toledo industries own eight planes which are used by their executives on business trips.

³Mr. M. W. Cochran, Airport Engineer for Pan-American Airways, has said that whether Toledo or Detroit gains recognition as a post-war air terminal will depend almost wholly on which city can offer immediate plans for facilities in the shortest possible time and have a program under way first. Detroit Free Press, November 5, 1943.

vail in air transport.¹

Air routes from Toledo to southerly points are much needed, as supplementary rail service is poorest in this direction.² The efficient services of United Air Lines and New York Central make eastern and western destinations more readily accessible.³

As mentioned at the beginning of this section, Toledo's central position in the Lower Lakes region with respect to numerous major population centers and an increasing number of air lanes makes it readily apparent that the city ranks high in air traffic to be accommodated. Although the larger metropolitan centers can provide more traffic-generating power, especially for passenger service, there are several other aspects of air transportation in which Toledo is important.

Weather conditions are of primary importance in air transportation, and the reliability of the Toledo area for having favorable local conditions has been well known to airmen. Exemplifying this is the need for instrument operations at the airport on an average of only fourteen or fifteen days (4 per cent) a year.⁴ Such a favorable physical phenomenon frequently makes Toledo an alternate stop for airlines seeking a haven in adverse

¹In 1940, the Cleveland-Detroit route ranked sixth in the United States in the number of passengers carried. A direct route (91 miles) across the western end of Lake Erie eliminates Toledo's sharing in this traffic (U. S. Civil Aeronautics Board, Economic Bureau, Airline Traffic Survey, September, 1940, Vol. I [Washington: Civil Aeronautics Board, 1941], p. 41).

²Coordination between eastern and southern rail lines is rather poor. A detailed brief was submitted to the Civil Aeronautics Board by the Toledo Chamber of Commerce, May 17, 1944. It presents the need of the community for air service to the southeast.

³The time elapsing enroute from Toledo to New York by plane (508 miles) is four hours and fifteen minutes and by 20th Century (728 miles) it is about twelve and one-half hours. In comparison, the best rail scheduling to Birmingham, Alabama (719 miles) is nineteen hours and forty-seven minutes and to Atlanta (690 miles) it is twenty hours and thirty-seven minutes. Computed from time tables of railroads and airlines.

⁴Instrument operation is required when the ceiling is less than 500 feet and the visibility less than 1 mile. One theory held for the infrequency of fog is that the Maumee River and Lake Erie act to draw it away from the airport. Interview with Mr. Harry Hale, Manager, Toledo Municipal Airport.

weather when other airports are closed.¹

Toledo's numerous transportation facilities provide an excellent opportunity to develop a high degree of coordination among the various services--highway, rail, and feeder air lines--and to hold a competitive advantage over neighboring cities. The rich hinterland of the city provides a market for this service. With the development of Toledo as the air entrepôt to this region, the city appears to be assured of a substantial growth as an air center.

¹As an example, on November 20, 1946 seventeen air transports sought the Toledo Airport, as fog blanketed practically all of the Lower Lakes region.

CHAPTER III

COMMERCIAL FUNCTIONS

Toledo, as a commercial center is aided greatly by a central location to which, from time to time, additional transportation facilities have been directed and at which a diversity of manufacturing activities has developed. As these two complementary primary functions--transportation and manufacturing--promote the broad trade of the city, so the surrounding rich rural lands dotted with towns and villages provide an active vicinal and regional area of trade. In developing and maintaining this substantial area of trade influence, Toledo has been benefited by its considerable distance from other large commercial centers. This is true particularly at the west where Chicago and Indianapolis respectively are 235 and 220 miles from Toledo. In addition to its large regional service area of especial interest to retailers and wholesalers, Toledo has an extensive national and a growing international market for its manufactured products. The numerous national rail and highway routes, on which Toledo is located, strengthens the city's ability in handling this broader distribution.

Section 1. Major and Minor Commercial Functions

In 1940 about one out of every four persons employed in Toledo, the major market of northwestern Ohio, was engaged in trade. Retail and wholesale handling and selling accounted for 22,000 persons while over 6,000 more were occupied in other commercial activities.¹

Toledo's importance as a trade center depends upon the population and purchasing power of the city and its tributary service areas (Fig. 21). Seventeen per cent of the total population of the Metropolitan District live beyond the corporate limits

¹See Table 4 for the number included in each group.

of Toledo. This is relatively low compared with many large centers. Figures for Cleveland, Detroit, and Akron are 28, 29, and 30 per cent respectively.

Retail sales in Toledo totaled \$131,629,000 in 1939. The resulting per capita sales for the city was \$466.¹ The ratio of Toledo's sales to Ohio's total for that year was 5.4 per cent. In national terms, the city held a rank of thirty-third among the country's retail centers. Of the 3,549 stores in the city, 3,102 or 87.5 per cent were independently owned in 1939. However, in sales this group accounted for only 71.5 per cent while chain stores claimed the remainder.²

To serve retail business of Toledo and its tributary area in 1939, 5,550 persons were employed in 499 wholesale establishments.³ Although numerically this group increased since the preceding census, the total sales showed a considerable decrease. Changes in wholesale activities have brought about this decline. The independent service wholesaler has been encroached upon by the manufacturers' distributors on the one hand and by the direct buying of retail chains on the other. Probably the most noticeable diminution of service wholesalers has been in the grocery field. In addition, the concentration of some wholesale lines such as dry goods, hardware, and shoes in a few principal centers, as New York and Chicago, has affected adversely Toledo and other intermediate-sized cities.⁴ In 1939, Toledo's wholesale employment and sales were 7.3 and 4.9 per cent respectively of the to-

¹Sixteenth Census of the United States: 1940. Census of Business, Vol. I, Retail Trade, 1939, Part III (Washington: Government Printing Office, 1941), p. 759. Figures for several other cities were: Detroit, \$410; Chicago, \$446; and Cleveland, \$479.

²Ibid., Part I, p. 330.

³Census of Business, Vol. II, Wholesale Trade, 1939 (Washington: Government Printing Office, 1942), p. 900.

⁴Whereas in the United States there are 184 major trade areas delineated for wholesale grocers, there are but forty-six wholesale dry goods areas having sixty-five major centers. Toledo is represented among the former but, in the latter, it lies within the primary area of Detroit and the secondary areas of three additional cities. See U. S. Bureau of Foreign and Domestic Commerce, Atlas of Wholesale Grocery Trading Areas, by E. S. Moulton, Market Res. Ser. No. 19 (Washington: Government Printing Office, 1938); and U. S. Bureau of Foreign and Domestic Commerce, Atlas of Wholesale Dry Goods Trading Areas, by E. S. Moulton, Econ. Ser. No. 12 (Washington: Government Printing Office, 1941). (Both processed.)



Figure 18. Airview of Toledo's Commercial Zone Looking Northeast.
(A and B, the Central Business District and Wholesale-Terminal District
respectively, show the areas included in Figures 19 and 20.)

tal for Ohio. Based on sales, the city ranked forty-sixth in the nation in wholesale trade. In this connection, it should be remembered that it ranks thirty-fourth in total population.

The Commercial Zone of Toledo is the major landscape expression of the city's function as a commercial center (Fig. 18). At its core is the Central Business District, a focal point for local and regional retail business (Figs. 18 and 19). Business services of considerable variety, financial houses, sales offices, and hotels also are concentrated largely in this district.

The outer portions of the Commercial Zone are made up of the Wholesale-Terminal District and smaller sections of similar but less concentrated trade activity. The close proximity to rail and motor freight terminals facilitates distribution to the local, vicinal, and regional markets.

In addition to the central commercial area, Toledo has a number of outlying trade centers. These commercial developments are strung along the principal city streets. Stores in these community districts chiefly are comprised of convenience goods outlets, interrupted by a minor admixture of shopping goods stores.

Besides the forementioned commercial functions, which are common to all cities, Toledo has a unique place among the grain centers of the United States. It is known as a consignment market, and it is said to be the country's leading soft winter wheat center. In 1945, over 47,000,000 bushels of grain were received in Toledo and about 28,000,000 bushels were forwarded.¹ In receipts, wheat accounted for more than 33,000,000 bushels and soybeans for well over 5,000,000 bushels.² These totals place Toledo seventh in wheat receipts and third in soybean receipts among fifteen prominent western grain centers.³ Although the city long has been a wheat center, dating back to the Canal days (pp. 47-50),

¹The city's twelve elevators have a total capacity of 13,389,000 bushels. From data provided by the Toledo Board of Trade.

²Slightly over 12,000,000 bushels of the total wheat were received via lake vessel. See n. 1, p. 90.

³Only Chicago and St. Louis outrank Toledo in soybean receipts. See Chicago Board of Trade, The Eighty-Eighth Annual Report of the Trade and Commerce of Chicago for the Year Ended December 31, 1945, Compiled by Lyman C. West (Chicago: Gentry Printing Co., 1946), p. 129.

her importance as a soybean market has followed the recent development of this crop in the United States. Toledo lies in a central position with respect to the soft winter wheat production of Ohio, Michigan, and Indiana, for the city's radiating rail lines can easily tap the entire area. Soybeans, which have increased markedly in northern Indiana and northwestern Ohio, gravitate to the same markets as the forementioned wheat.

Section 2. Distribution of Commercial Functions in the City

The commercial functions of Toledo--retail, service, management, and wholesale--exhibit a high degree of localization in their distribution. They follow a general pattern similar to that of other major American cities, but the centering of the various functions in particular areas arises from the genesis and interrelation of population, highway, and other patterns in Toledo. The three first-mentioned commercial functions--retail, service, and management--have their greatest concentration and most specialized forms in the Central Business District at the core of the Commercial Zone (Fig. 1 and 18).

In addition to its Central Business District, Toledo has nine major outlying commercial centers where retail and service businesses have congregated (Fig. 1). The localization of these activities is associated closely with the distribution of major thoroughfares and with the major residential areas. This has resulted from the formerly accepted practice of "strip" zoning many of the main arteries for commercial use.¹ In most instances, the satellite commercial centers have developed at the intersection of two or more of these business thoroughfares. Interspersed among the forementioned centers are numerous neighborhood store clusters, made up principally of convenience goods outlets.

In addition to the central and outlying business areas

¹Approximately 3.54 per cent of the usable land area of Toledo (land area exclusive of streets and alleys) is used for commercial purposes. This is about 47 per cent of the usable land area zoned (7.48 per cent of the total area) for commercial use. Data from MS records of the Toledo and Lucas County Plan Commissions.

In Chicago, it is estimated that only 40 per cent of the frontage zoned for commercial purposes was used thus. See Harold M. Mayer, "Patterns and Recent Trends of Chicago's Outlying Business Centers," Jour. of Land and Pub. Util. Econ., XVIII (February, 1942), 15.

which serve the general public, there is the peripheral area of the Commercial Zone in which wholesaling and other commercial activities are dominant and which have few direct dealings with the ultimate consumer. The major center for such enterprises is the Wholesale-Terminal District south of the Central Business District (Figs. 1 and 18). Although less pronounced, wholesaling, jobbing, and local business areas also occur in the other outer portions of the Commercial Zone. In this fringe area, moreover, poor residences are interwoven with commercial structures and constitute one of the most serious slum elimination problems of the city.

Central Business District

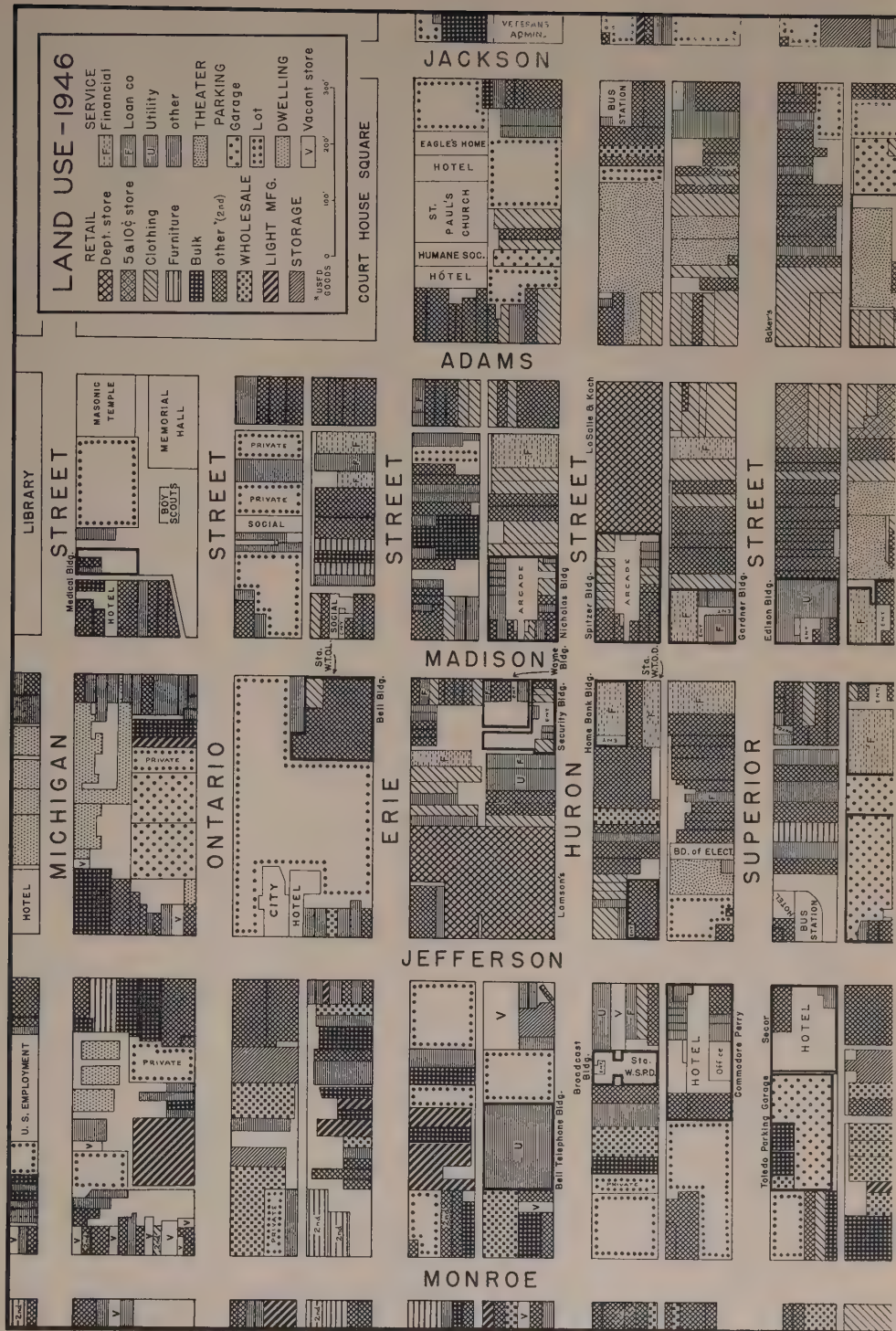
The Central Business District (Figs. 18 and 19) is in the heart of the Commercial Zone and represents the climax area of business activity in northwestern Ohio.¹ As shown in Figure 19, the district extends from Monroe Street on the south to Jackson Street on the north and from Summit Street on the east to Michigan Street on the west and includes the frontages adjacent to this square area which covers twenty-two blocks.² At the southeast corner of this district (Monroe and Summit streets) Toledo had its initial development.³ The geographic and commercial centers of the district are at approximately the same position--in the vicinity of Madison and Superior streets. This central quality is revealed both by intensity of land use (high buildings) and heavy traffic concentrated about the intersection.

The reader will recall that the focal point of commercial

¹Compared with most other cities of the Middle West, Toledo's atmosphere is relatively clean. Especially beneficial to the smoke situation in the downtown area is a central heating plant which serves about 210 buildings. See Coal Producers Committee for Smoke Abatement, *op. cit.*, pp. 1a, 2a. This publication lists two heating plants, but since this time one has taken over all of the service.

²The section from Water Street to the river has been included in Fig. 19, but this waterfront strip of made land is functionally a part of the less intensively-used commercial belt which surrounds the Central Business District.

³As previously mentioned, this site is at the confluence of Swan Creek with the Maumee River. The river was too broad to allow any early crossing which might have resulted in the city's development around a bridgehead.



activity was not at the above-mentioned location at an earlier date. Until the 1920's, Summit Street held this position. This street originally ran along the crest of a ridge known as the "Hog's Back" and was the only road connecting Upper and Lower Town as Port Lawrence and Vistula, respectively, were known (Fig. 5). Removal of some 20 feet off the top of this ridge provided material for fill along the riverfront and in the present center of the Central Business District.¹ There was a sharp division in the type of trade along Summit Street in its heyday. The river side of the street was primarily wholesale, while the major retail stores lined the west side.

Migration of the center of business away from the waterfront is not unusual as is shown by similar migration in many of the major cities bordering the Great Lakes--more especially Cleveland, Buffalo, and Detroit. In Toledo, the beginning of this shift may be taken as 1900 when the first major store, LaSalle and Koch's, moved westward, first to Superior Street and later to Huron Street. Since that date, four other major businesses have followed and have erected structures on new sites.² The merchants have shown considerable concern over a possible continued migration westward. Among the conditions promoting this trend are (1) the major population of the city and suburbs reach the downtown area from the west, (2) the better economic and social areas are to the west in comparison with the Wholesale-Terminal District to the south and a low quality commercial and poor residential area to the north, and (3) the newer public buildings (library and Y.M.C.A.) and hotels are erected on the west border of the Central Business District.

There has been no "Main Street" in the Central Business District since Summit Street began to wane. Nor is there any clear-cut localization of the various commercial activities. Per-

¹The area roughly from Superior Street west to Michigan Street was originally marshland with a creek meandering through it. Early expansion in Toledo had to hurdle this marsh to continue building. Although the area was filled in many years ago, the fossil stream bed still provides a considerable handicap for engineers erecting buildings along its course. This is the so-called "underground river" which receives sporadic notice in the local newspapers.

²These companies are Lamson's, Baker's, Stein's, and Broer-Freeman's. Several other large stores which did not move went out of business.

haps the gradual migration of the district has prevented such an occurrence. Nevertheless, certain more general groupings are apparent. This is especially in evidence among the shopping goods group.¹ Most shoppers going downtown find their needs within the concentrated retail area bounded by Summit, Jefferson, Adams, and Huron streets. However, a large share of those who leave their cars in parking lots find it necessary to pass through one of the bordering blocks, as there is little land available for parking in the heart of the Central Business District.²

Adams Street consists almost entirely of retail stores and is characterized by numerous wearing apparel shops. This east-west thoroughfare links the other two principal shopping streets--Summit and Huron. The latter two streets lie three blocks apart and each has developed somewhat its own patronage. Many of the shoppers attracted to one area seldom venture to the other. Summit Street, the east limit of the Central Business District as well as of the concentrated retail area, is Toledo's former retail Mecca. Along this street are many bargain shops of the wearing apparel and variety type.³ Signs bearing the names of the various stores are very apparent everywhere. Much of the loft space has remained vacant for years. With one exception--Sears Roebuck--the department stores which remain here are clustered near the Adams Street intersection. On the east side of Summit Street are concentrated the downtown furniture marts, located in ancient buildings and on lands which have a lower evaluation and tax than more centrally located sites. All of the variety stores (5 and 10's) are located on Summit or Adams streets, for here the traffic in economy-minded shoppers is heaviest.

Huron is the third major shopping street. In addition to the two department stores which moved from Summit Street (LaSalle and Koch's and Lamson's), Huron Street has a number of fashionable shops. An arcade in the Spitzer Building adds to the available

¹Included in the shopping goods group are department stores, apparel shops, and furniture stores.

²There are only two parking lots and one garage within the concentrated retail area.

³One writer has described Toledo as a "price town," placing price paramount, with style second, and quality third. The large industrial population is credited with encouraging this condition. See Randolph, op. cit., p. 87.

store frontage in this area as well as providing, with LaSalle and Koch's, a sheltered walk for an entire city block. Huron Street benefits from the functional convenience of the numerous busses routed along it.

On the whole, the buildings in the Central Business District show that they are at least forty years old. There has been only a small amount of construction in recent years. To offset this, many of the downtown shops have attempted to disguise their ground floor exteriors and thus gain a modern touch by the use of a local product--opaque colored glass--for their store fronts.

Madison Avenue provides Toledo with a modest business and financial canyon. Along this street, which acts as the spine of the Central Business District, are located a dozen major office buildings (Fig. 19).¹ Architecture of many decades is represented by these buildings ranging from that of the ten-story brick Spitzer Building, completed in 1896, to the three-story, stone-faced Bell Building a block farther west and first occupied in 1936. The former structure is said to be the first office building with steel-beam construction in northern Ohio, while the low Bell Building indicates the recent trend in office buildings, a far-cry from the twenty-eight-story Ohio Building completed in 1929.

The ground floors of the office buildings chiefly are occupied by banks, brokerage houses, specialty shops, and service establishments, whereas the upper floors provide office quarters for various professional services and commercial organizations. These office buildings have maintained a very high percentage of occupancy largely because a number of major Toledo manufacturers have located a large segment of their office staffs here. Outstanding in this respect is the 368-foot Ohio Building. More than half of the building is used for the main offices of the Owens-Illinois Glass Company and its subsidiary divisions.²

The office workers and department store clerks provide the bulk of the congestion which occurs on the public transporta-

¹The major office buildings and hotels are outlined with heavy black boundaries in Fig. 19.

²In March, 1946, the three glass companies which have their home offices in the Central Business District--Owens-Illinois, Libbey-Owens-Ford, and Owens-Corning--had a total of 1,400 persons on their downtown staffs. Data secured from the personnel or office manager of each company.

tion facilities in the morning and evening and in the restaurants and drug stores at noon hour.¹

Hotels are another of the urban activities located almost entirely within the commercial core. This location is advantageous for many patrons who have numerous contacts to establish in the nearby office buildings and stores and for executives who find quarters here convenient to their business and social activities. Until recent years, the first-class hotels all were within the Central Business District. However, three of the eight major hotels are now to the west of this congested district. Six of the total group are largely transient hotels and provide 1,800 rooms.² The largest and most opulent structure is the Commodore Perry, a seventeen-story structure named for the American commander who defeated the British fleet near Maumee Bay in 1813. Another, the Fort Meigs, is named after a famous battle site up-river from the city.

Commonly, the house count in Toledo hotels drops over the week-end, for patrons come to the city primarily for business reasons. Such a decline results in many industrial cities where the principal attractions are the home offices and production centers of a number of manufacturing establishments. It also is characteristic of small and medium-sized cities. In contrast, Detroit, Cleveland, Chicago, et cetera show an increase over the week-end. A wide variety of amusement activities encourages the transient to seek the larger cities at this time.³

The conventions held in Toledo provide an added source of business for the hotels and shopping goods stores. In the last normal year--1941, conventions brought 23,950 persons to the city. These meetings may be grouped as follows: eleven national, twelve

¹The seven Toledo department stores had 3,448 employees in 1939. This is the largest group of retail employees in the city accounting for 22 per cent of the total. See Sixteenth Census of the United States: 1940. Census of Business: 1939, Vol. I, Retail Trade, Part III (Washington: Government Printing Office, 1941), p. 759.

²Toledo has forty-one hotels with a total of 3,781 guest rooms. Thirty-six of the hotels have twenty-five guest rooms or more. Sixteenth Census of the United States: 1940. Census of Business: 1939, Vol. III, Service Establishments (Washington: Government Printing Office, 1942), pp. 578, 621.

³Interview with Mrs. Clarice Canelli, Secretary, Toledo Convention Bureau and Toledo Sunday Times, December 16, 1945, p. 1.

regional, thirty-five state, and fourteen district. Toledo is handicapped in securing large national conventions by the proximity of such major centers as Detroit, Cleveland, and Chicago which have much greater hotel accommodations.¹ Nevertheless, for the national meetings of medium size, Toledo's central location makes it a favorable choice. A practice of rotating the location of many state conventions partially removes the disadvantage of Toledo's corner position with respect to the state.

The remaining activities of the Central Business District which show a considerable degree of localization are the business and personal service, bulk retail, and wholesale establishments; physicians' and dentists' offices; government offices; and social activities. Some of these groups operate successfully on secondary streets, but each takes advantage from the convenience of location to all sections of the city and from being within easy walking distance of the financial and shopping areas.

Business service, bulk retail, and wholesale enterprises are located chiefly in the borders of the Central Business District. These businesses are not particularly dependent upon a high volume of trade or upon a central location. The first two are especially numerous in the western portion of the Central Business District and extend beyond this area along all of the east-west thoroughfares. Wholesaling is located chiefly along the southern border of the Central Business District and thus provides a zone of transition into the adjacent Wholesale-Terminal District. Along Monroe Street, which divides these two districts, are a number of second-hand stores, cheap restaurants and hotels, and a few vacant stores. The unoccupied store space arises from the undesirability of this area for retail businesses and the inadequacy of the structures for many types of wholesalers.

"Doctors' Row" occupies several blocks along Michigan Street, the west border of the district under consideration. There is a contrast here between the former practice of seeking quarters in apartment buildings and the present tendency to locate in specialized office buildings. The concentration of doc-

¹At present, Toledo's hotels can accommodate conventions having approximately 400 out-of-town representatives. In comparison, Columbus, Ohio hotels can house about three times this number. See first source in previous footnote.

tors in this area, however, is limited by the inadequacy of office space. Recently several medical-dental buildings have been established a few miles west of the Central Business District but along major traffic arteries. These locations are more easily accessible to the patients from a broad section of the city and are nearer to most of the hospitals.

The Civic Center is not considered as a part of the Central Business District, but it occupies an adjacent position and has a close functional relationship to the district (Fig. 1). This civic area, developed from six city blocks, is the only park-like space in Toledo's Commercial Zone. The Lucas County Court House, completed in 1896, occupies the area of two city blocks and was the first structure in the Center. However, twenty years passed before the idea of developing a Civic Center was conceived.¹ By combining four blocks to the north of Court House Square, a large tract has been created. The streets eliminated here have provided space for a beautifully landscaped mall. Arranged around this beauty spot are the Safety Building (present City Hall), Federal Building, County Jail and power house, and the Water Department Building. The latter two structures eventually will be replaced. An adjacent block holds the Police and Fire Alarm Building. In the future, it is planned to continue the Civic Center northward to Cherry Street. It appears to be better to use this latter frontage for public gardens and buildings than to let it remain an undesirable, unprofitable piece of real estate. Despite a sizable movement of people to the Civic Center, business has not been attracted to this area. Nor has the value or appearance of adjacent property been noticeably affected.

The frontages abutting on Court House Square provide sites for a number of social activities. Three fraternal organizations (Elks, Eagles, and Masons) and several public organizations and agencies are located here. Although this area appears to be poor from a commercial standpoint, it provides a choice vista for the occupants. It is doubtful if similar development will take place along the borders of the newer portions of the Civic Center located beyond the Central Business District and in an area of wholesaling and light manufacturing.

¹For an outline of the development of the Civic Center see Toledo and Lucas County Plan Commissions, op. cit., pp. 21-22.

A high degree of localization occurs in another activity classified here as social--the motion picture theaters. The blaze of lights in front of these movie houses along St. Clair Street, between Madison and Jackson streets, makes this Toledo's "white way" (Fig. 19). Intersecting the principal shopping street--Adams Street--the stores and theaters benefit from this close relationship. The nearness of entertainment places to one another demonstrates clearly how proximity of competing establishments aids business. However, the two newest downtown theaters, following the commercial trend, have chosen sites several blocks away to the west. A tawdry counterpart of the forementioned amusement center occupies the frontage of the block along Superior Street north of Adams Street. Penny arcades, cheap movies, novelty stores, and eating places are the rule here.

Commercial functions so completely occupy the ground floor store space of the Central Business District that little or no room remains for new enterprises. This shortage developed as a result of the increased buying power during the war period when a number of store rooms, vacant since the "depression thirties," gained occupants. Since the end of the war, additional new enterprises have placed ground floor space at a premium.¹ The certainty of a continued demand for such space will necessitate additional structures. Land for these buildings will require razing of old commercial buildings, utilizing the sorely needed parking lots or choosing sites along the border of the Central Business District.² When the latter occurs, evidence strongly suggests it will take place on the western border.

The recent boom in store alterations and rehabilitations suggests the desire of business, particularly retail, to remain in the Central Business District despite the old buildings. Ex-

¹When the land use map of the Central Business District (Fig. 19) first was prepared in the summer of 1945, there was a considerable number of vacant store buildings. However, the great amount of new business since that time has necessitated a revision of the map.

²It does not appear that additional tall buildings are required in Toledo at the present. The principal need is for ground floor space for retail outlets. As upper floors can be fully occupied only at the expense of existing office buildings, the erection of additional edifices of this type seems unwarranted.

emplifying this intent are the additions of new façades to the ground floors of buildings, the rejuvenation of building exteriors by cleaning, and the installation of modern interior equipment.

The greatest problems in the Central Business District are those associated with the private and public conveyances--whether moving or parked. The streets in this area are 36, 40 or 48 feet in width with the majority in the first two categories. Such narrow thoroughfares give rise to a great deal of traffic congestion, as all modes of intracity transportation and a portion of the intercity highway traffic are focused on this central district. In an attempt to alleviate this critical traffic situation, which reaches its peak between 4:30 and 5:30 P.M. when stores and offices are closing, several east-west and north-south streets have been designated as one-way thoroughfares. The impossibility of widening most of the downtown streets, due to the abutting buildings, creates a formidable problem.

Added to the traffic difficulty is the parking predicament. Two kinds of parking are involved: (1) the day-long or "static" type, and (2) the short-time or "dynamic" type. The former has been called a liability, as the owners are engaged in the activities of the downtown area.¹ Actually many of the retail stores and service enterprises owe much of their business to this group. Even short-time parking is a questionable asset when the site chosen is on a narrow downtown street. In accordance with this belief, daytime parking on one side of Madison Avenue has been eliminated. To accommodate "dynamic" and "static" parking, several facilities are available. Metered curb parking coincides closely in area with the Central Business District. Public lots and garages in and near the Central Business District provide off-street parking facilities for approximately 6,500 cars.² These facilities are located principally in the outer

¹Cf. Gordon Whitnall, "Urban Disintegration and the Future of Land Investment," Jour. of Land and Pub. Util. Econ., XVII (November, 1941), 446.

In 1940, there was one passenger car for every 3.6 persons in Toledo (78,586 cars). The 13,034 additional registrations brings the figure to 3.1 persons per motor vehicle. Computed from data supplied by the Bureau of Motor Vehicles, Columbus.

²A survey made by the writer in November, 1946 shows

portion of the district or within a block beyond its borders (Fig. 19). Several of the downtown stores have introduced subsidized parking in an attempt to meet the difficult parking situation. To obtain added parking space, the Retail Merchants' Association has suggested removal of over-aged buildings in the borders of the Central Business District. Others have proposed the erection of open-faced, multiple-story parking garages to be owned by the city or business groups.

A final consideration in the area being examined is that of land value. The location having the highest assessed frontage evaluation in the city is at the corner of Adams and Superior streets, the approximate center of the shopping area. Here the unit foot frontage evaluation (per foot front per 100 foot depth) reaches \$3,600.¹ Decreases in value are not equal in all directions from this point. To the north, the drop is rapid so that Jackson Street, a block away, has a unit foot frontage value of about \$350, whereas, along Madison Avenue, a block to the south, the value is from \$1,500 to \$2,700 for four blocks. There is a high correlation between frontage evaluation and pedestrian traffic.

Changes in land value in the Central Business District over the last quarter of a century provide significant data for studying the future trends in the area. The block bounded by Summit, Madison, Jefferson, and Water streets had a land value of \$1,233,000 in 1920. In 1945, the value had decreased a million dollars to \$232,120 or 19 per cent of the former value.² The unit front foot value now averages \$350 in comparison with a cal-

eight public parking garages accommodating about 2,550 automobiles. The forty-odd public lots within the Central Business District or within a block beyond this area have a total capacity of approximately 3,950 cars. There are about a dozen small additional lots for private use.

¹See Land Value Manual: Lucas County, 1937 (Toledo, December, 1937), p. 16.

²Data for 1945 were obtained from the assessment volumes of the Lucas County Appraisal Department, while the 1920 statistics were taken from records in the Lucas County Treasurer's Office.

The 1945 figures are based upon the 1937 real estate assessment. Although the present real value of the Summit Street area probably has increased, a similar increase also would occur in other portions of the Central Business District.

culated value of \$1,860 in 1920.¹ Along the south side of Adams Street between St. Clair and Superior streets (adjacent to the most valuable corner), the unit front foot value has increased from approximately \$3,020 to an average of \$3,300. Along the same side of Adams Street two blocks westward (between Huron and Erie streets), the unit frontage value averages \$1,450 per foot as against a derived \$1,520 for 1920.²

The sharp decrease in land value on Summit Street and the minor changes on Adams Street suggest several possible trends in the Central Business District. One is that land values here are, in general, decreasing. Another is the migration westward of the focal point of the area. A third is the change in size of the major retail area. The first two conditions are the principal factors in force at present. Migration has tended to expand and disperse the major retail area, but commercial decentralization and future economic depressions will bring a shrinking in the eastern or Summit Street portion of the district. A proposed park and highway development between Summit Street and the river appears to be the only means of stabilizing the area.³

Outlying Business Districts

Toledo and "Suburbia" are served by numerous business enterprises outside of the Central Business District. They range in structure from a small-scale replica of the Central Business District to the isolated cluster of two or three stores.⁴ Many of these business aggregations serve only the immediate needs of the surrounding residential areas. However, the nine outlying business centers shown in Figure 1, and perhaps several others, attract patrons from a wide area and provide for many of their

¹As frontage evaluations are not available for 1920, the writer derived them by the proportional method.

²Although the average evaluation along this block in 1945 was about 96 per cent of the 1920 figure, the half block nearest Huron Street showed a gain during this period.

³See Transportation Report: Central Business District, Toledo, Ohio (Toledo: Toledo Chamber of Commerce, 1946). (Processed.)

⁴See M. J. Proudfoot, "Intra-City Business Areas for Principal Cities," Jour. of Marketing, I (January, 1937), 231-35.

wants. As noted earlier in this chapter, the major outlying commercial developments lie along the principal business thoroughfares. Substantiating this fact are the locations of neighborhood theaters--establishments which are commonly a part of the larger intracity business centers. All but one of sixteen such theaters are situated along main thoroughfares and also are in significant business centers. In addition, only the two most recently developed outlying centers shown in Figure 1 are without branch post offices.

The outlying business clusters and alignments have developed as a result of centrifugal forces made up of traffic congestion and high cost of land in the Central Business District balanced against available parking space and lower land values in the outer zones of the city.¹ Unlike the outer zone of retail sub-centers (especially Centers H and I, Fig. 1), however, those in the middle zone of the city (Centers A through F) developed before the critical traffic and parking problems of the Central Business District arose. With the migration of higher income groups to newer residential sections on the periphery of the city and with the subsequent rise of business centers here, the middle zone business centers are becoming static. These latter centers, except along Main Street in East Toledo, lie one and one-half to two miles from the city's central shopping district.

Although many business activities in Toledo have been decentralizing, the banking group has shown a reverse action since the depression of the 1930's. Today, as shown in Table 15, the six Toledo banks have only four branches, whereas, in 1930 there were fourteen banks with forty-two offices outside the Central Business District. The high degree of localization of financial services in the core area has aided other businesses located here.

The largest outlying business center in the city is east of the river along Main Street (Fig. 1, Center A). Before 1853, the settlement in this area was called Yondota and was not a part of Toledo (see Fig. 6). The first bridge across the Maumee was located at the foot of Main Street, but this structure was not built until 1865. Consequently, it is not surprising that a second business district developed on the east side of the river.

¹See C. C. Colby, "Centrifugal and Centripetal Forces in Urban Geography," Annals of the Assn. of Amer. Geographers, XXIII (March, 1933), 1-20.

This repeats the history of most river-crossing settlements. After the bridge (Cherry) was opened, the Main Street business district continued to develop, as this remained the focal point for all traffic crossing the river (except for railroads) until 1896 when a second bridge spanned the river.¹ Today the entire length of Main Street (six blocks) is a business thoroughfare and similar usage continues for several blocks along Starr Avenue.

TABLE 15
BANKS AND SAVINGS & LOAN ASSOCIATIONS
IN TOLEDO 1930 AND 1946^a

Offices	Banks		Savings & Loan	
	1930	1946	1930	1946
Central Business District	14	7 ^b	6	3
Outlying Business Districts	42	4	6	3
Total	56	11	12	6

^aOhio Bell Telephone Company, Toledo and Vicinity Telephone Directory, (February, 1930 and June, 1946).

^bThe Toledo Trust Company has two offices in the Central Business District.

As stated earlier, the East Side has developed a strong sectional loyalty. Added to the geographical affinity imposed by the river barrier are such social developments as clubs, athletic teams, and a local newspaper. Advertisements in The Sun encourage buying in the Main Street district. The wide variety of enterprises here can meet nearly all of the needs of the residents east of the river. Among the many retail outlets which include furniture stores, automobile salesrooms, variety stores (5 and 10's), and super-markets, there are branches of several downtown

¹This was the Fassett Street bridge. The next highway bridge was the Ash-Consaul structure built at its lower river location in 1913. Data from "Semi-Annual Report of the Division of Bridges, May 1, 1939" (Toledo: Division of Bridges, 1939). (Mimographed.) Also Toledo Blade, October 26, 1931.

businesses including an auto accessory store, a shoe store, a drapery shop, and an electrical appliance store.

Although all of the bus lines serving East Toledo come to Main Street to cross the river, it is just as simple for shoppers arriving at this center by bus to continue on to the Central Business District to make their purchases. Thus the northern and southern extremities of the East Side contribute much less to Main Street business than the nearer middle section. Neighborhood centers east of the river are comprised chiefly of food stores, drug stores, and filling stations. The largest of such centers is at the Woodville-East Broadway intersection.

West of the river, where 85 per cent of the city's populace live, are a number of commercial alignments along principal traffic arteries and commercial sub-centers at the intersections of some of these heavily traveled routes. Among the major commercial thoroughfares are five routes radiating from the central portion of the city (Fig. 1). The streets are, from north counter-clockwise, Lagrange, Cherry (Ohio 120), Monroe (U. S. 223 and U. S. BR 20), Dorr (Ohio 246), and Broadway (U. S. BR 24). The principal crosstown highway, Detroit Avenue (U. S. BR 25), also has considerable commercial frontage, especially where it intersects important radiating arteries. On the East Side, a similar commercial thoroughfare, Oak and Front streets, roughly parallels the Maumee River. An additional important business street is Sylvania Avenue, which in twenty years has emerged from an unpaved road to become one of the city's largest outlying business sections. Much of Toledo's residential building of recent years has been in this district known as West Toledo. The location of a number of major industries in close proximity, although not within the area, has been an important factor in this development.

Many of the principal commercial sub-centers are concentrations along the above-named thoroughfares. Among the focal points having the widest variety of business enterprises are those at and near the following intersections (see letters in Fig. 1): (B) Lagrange and Central,¹ (C) Collingwood and Delaware, (D) Monroe and Detroit, (E) Dorr and Detroit, (F) Broadway and South, (G) Sum-

¹This intersection is near the center of the city's largest Polish community. This national group also contributes considerably to the business activity in the Dorr-Detroit district.

mit and 116th, (H) Sylvania and Phillips, and (I) Monroe and Central. The innumerable smaller store clusters have not been identified due to their size, but the commercial frontage along the principal thoroughfares is shown in Figure 1.

The Monroe Street-Central Avenue development, known as the "Colony" area, is the most recent of the outlying commercial centers and represents one type of planning along a particular functional line. Several stores have been located here for a number of years, but the major growth began in 1940. At this time, a large \$500,000 store block was erected by a corporation in a portion of the center outside the city limits. In 1941, the area containing this property became a part of the city. Supermarkets especially were noticeable at the outset, but the commercial base is broadening rapidly. Drawing patrons from fast-growing superior residential sections and the non-commercial village of Ottawa Hills assures a continued expansion of this center, which has as one of its assets considerable parking facilities.¹ Several other sub-centers as well as the Central Business District have been affected adversely by the "Colony" development.

One highly important intersection which has shown little expansion despite a very heavy volume of traffic is at the Detroit-Collingwood-Cherry junction (Fig. 1). This is due to (1) the preoccupation of much of the land before the great development of automobiles and the residential areas to the north, and (2) the dense flow of traffic (U. S. BR 23, 24, and 25) which discourages parking or crossing the wide thoroughfares.

Unlike the Central Business District, the outlying business centers show little tendency to migrate although expansion has taken place. Apparently the centripetal attraction of an important intersection is sufficiently strong to overcome any shifting. Where extensions occur, they are toward the areas of stability or new growth.²

The character of the three newest satellite business centers (G, H, I) is one of further growth. Only the Sylvania Avenue

¹The latest direction of expansion from this center has been along Monroe Street beyond the city limits. Continuance will reduce markedly the efficiency of this interstate highway (U. S. 223).

²Cf. Mayer, "Patterns and Recent Trends of Chicago's Outlying Business Centers," op. cit., p. 10.

center (H) can be said to be reaching maturity. At the "Colony" center (I), additional services are being introduced almost continually. The commercial center in Point Place (G) is hampered by physical barriers (water and marshland) from any broad residential expansion and thus from any extensive additional local patronage. However, plans for directing the major route to southeastern Michigan through this area provides the center with brighter commercial prospects.¹

Outlying commercial centers appear likely to develop in at least two additional sectors of the outer zone of Toledo in the future. Their general locations are associated with (1) the principal directions of residential building other than that beyond the Sylvania-Phillips (H) and the Monroe-Central (I) centers and (2) the locations of major radiating thoroughfares. One feasible point of attachment appears to be at the intersection of Dorr Street and Secor Road, about 2.5 miles west of the Dorr-Detroit (E) commercial center. This site is beyond the city limits. Another center might well be expected to develop in the southern part of the city. A logical location here is one in the immediate vicinity of the Anthony Wayne Trail (Ohio 577). A regulation against curb cuts along this boulevard highway will prevent commercial use of frontage on the right-of-way. As the area is within the city, zoning will be an important factor in any ultimate location.

Wholesale-Terminal District

The Wholesale-Terminal District is the outer portion of Toledo's Commercial Zone given most completely to the commercial function. The variety of activities among this functional group results in a wide range of services being performed here (Fig. 20). As the reader will recall, this area lies south of the Central Business District (Figs. 1 and 18). The other borders of the Wholesale-Terminal District are, in approximation, a public housing project on the west, Swan Creek and the approach to the Anthony Wayne Bridge on the south, and the Maumee River on the east. The peninsula between the creek and river in the eastern sector long has been known as the "Middle Grounds." Although not included in Figure 20, the area south of this peninsula to the vicinity of

¹For mention of this proposed highway development see p.

the Union Station has a function which is, in general, similar to the area delimited.¹

Development of the Wholesale-Terminal District dates from the start of Toledo, as the northeast corner of this district, together with several adjacent blocks in what is now the Central Business District, was included in the town plat of Port Lawrence (see Fig. 5). Until the latter 1800's, the businesses north and south of Monroe Street along Summit, St. Clair, and Superior streets were similar. However, as expansion from this nucleus took place, the area south of Monroe Street began to show a marked change in character. General retailing gave way to bulk retailing, light manufacturing, and wholesaling. The lower course of Swan Creek and the Miami and Erie Canal extension (now the railroad right-of-way in the western portion of the Wholesale-Terminal District, Fig. 20) were significant factors affecting the development of the land lying between them.² At an early date, lumber yards began to locate along Swan Creek to the vicinity of the Miami and Erie Canal locks and outlet (Fig. 20). With the removal of the hardwoods from the Maumee Valley (brought to Toledo by river and canal) and the lake border east of Toledo, the pine forests of Michigan became the next source of supply. Following the discontinuance of receipts of timber by water from this northern area, the creekside locations lost their advantages as lumber yard sites. At this time, warehouses and grain storage elevators also found the waterfront near the mouth of Swan Creek and along the river on the Middle Grounds to be desirable (see Fig. 7). With the decline in the relative importance of water transportation and the rise of railroads, however, these activities, like the lumber business, came to have less dependence upon the riparian frontages in the Wholesale-Terminal District. The early start of the forementioned kinds of activities in the Wholesale-Terminal District, together with the centering of railroad and interurban terminal facilities here, nevertheless prompted the

¹In Fig. 1, the forementioned extension is included in the Commercial Zone, while the aerial photograph, Fig. 18, shows this area to be made up principally of rail yards.

²At this time, Swan Creek had several meanders in its lower course which caused Summit Street to terminate at Washington Street and brought the stream nearer to St. Clair Street than at present. Subsequently, the channel was straightened and the unused segments were filled.

TOLEDO, OHIO

WHOLESALE-TERMINAL DISTRICT

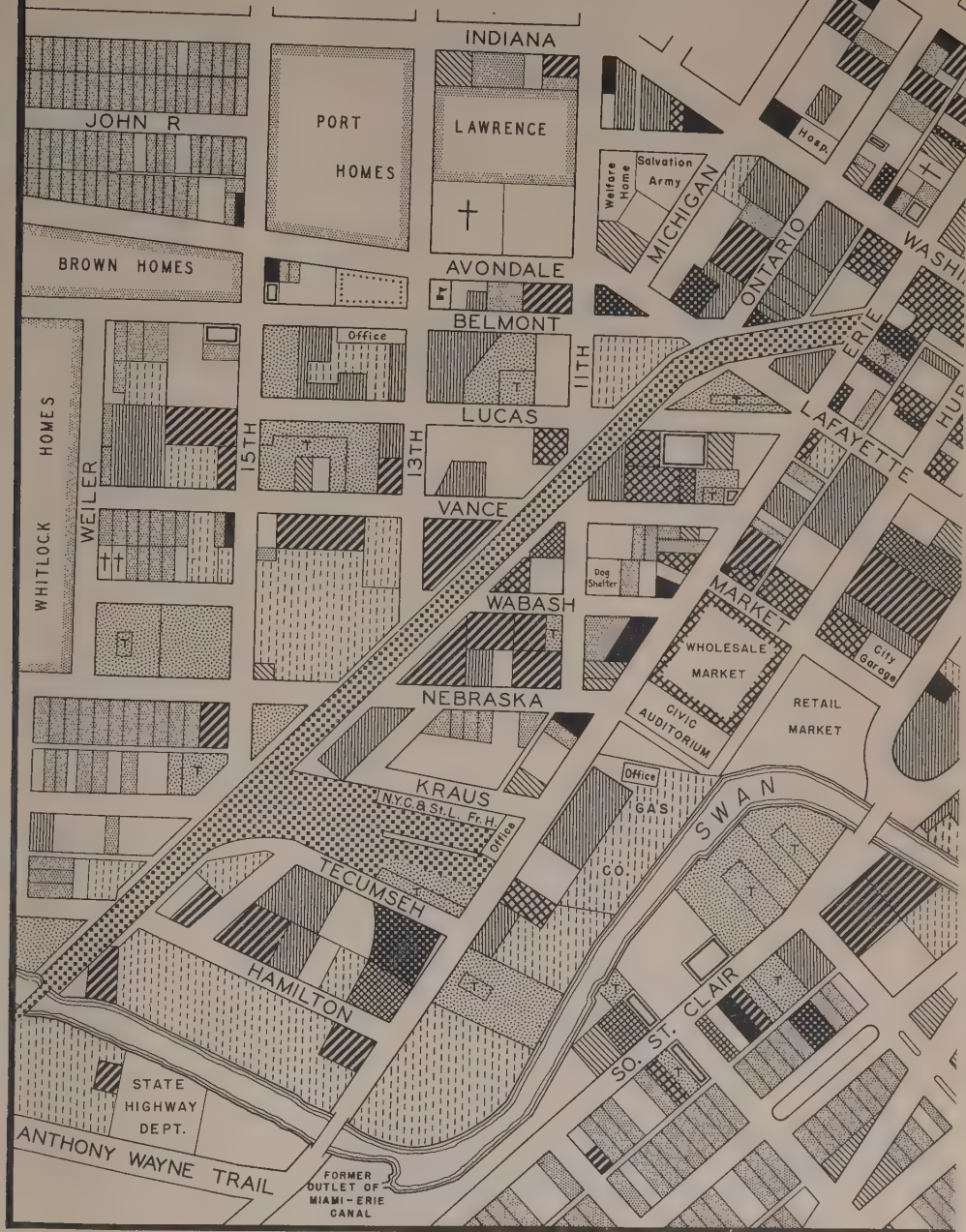


Figure 20

LAND USE-1946

- | | | |
|---|---|---|
|  WHOLESALE
FOOD - OTHER |  STORAGE
INDOOR-OUTDOOR |  DWELLINGS |
|  TRANSPORTATION
TRUCK-RAILROAD
(T - TRUCK TERMINAL) |  RETAIL
GENERAL-BULK |  VACANT BLDGS. |
|  MANUFACTURING |  PARKING LOTS | |
|  GARAGES &
SERVICE STA. |  VACANT LAND | |



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continuance of a commercial development along lines other than retailing. Manufacturing, then on a small scale and not so markedly different from the commercial activities, also found this district desirable.¹

Today, as suggested by the designation given the area under consideration, bulk handling of goods by wholesalers and transportation agencies is the principal activity of the district. Among the wholesale interests, those handling food products, such as fruit and vegetables, meats, and staple goods, are most conspicuous. The number and widespread distribution of motor and rail freight terminals and yards also make the importance of these facilities readily apparent. Other important uses of land in the district are for storage, both indoor and outdoor, for bulk retailing, and for light manufacturing. In a number of cases, two of the forementioned activities operate as a unit.

Before considering some of the features of the various activities operating in the Wholesale-Terminal District, a listing of several factors for their localization and continuation in this particular area might be helpful. Among these are:

(1) The mutual advantage to the several activities within the district to be in the vicinity of one another for economical transfer of bulk quantities of goods.

(2) The convenient proximity to the Central Business District for wholesalers, storage companies, and transportation agencies to make deliveries and for bulk retailers and such light manufacturers as printers to gain additional patronage.

(3) The central location with respect to the outlying commercial districts.

(4) The availability of relatively low-cost land and old but substantial buildings for businesses requiring extensive storage space.

(5) The early development of the district for commercial and industrial activities.

¹A check through the classified section of the Toledo City Directory, 1890-91 shows a diverse group of manufacturers, principally of metal goods, along St. Clair Street south of Monroe Street. It is interesting to note that several of the companies still are located here. In 1890, a number of hotels had sites in the northeast portion of the Wholesale-Terminal District. Proximity to the railroads undoubtedly was a strong influence in choosing this area.

The sequent innovations in transportation--canal boats, railroads, interurbans, and trucks--all have contributed to and aided in developing and retaining the break-of-bulk function in the Wholesale-Terminal District. Railroads followed the canals in time and, as they established their freight houses and rail termini in this district, wholesalers were encouraged to choose sites nearby in order to facilitate the transfer of shipments to their warehouses.

The first quarter of the present century saw the rise and decline of the electric interurban, a transportation facility with nearly all of its freight houses in the Wholesale-Terminal District. There is a close correlation in the heydays of this means of transportation and that of the Toledo wholesaler, for the interurban lines provided rapid delivery service to many villages and towns. Trucking has been a major factor in the decline of both activities. Interurbans have been replaced even to the extent of the highway carriers occupying their freight houses. The wholesale business has suffered from truck deliveries direct from factory to store, thus eliminating the wholesale function. Most of the city's sixty-odd intercity truck lines have their terminals in this area under consideration. The concentration here, near the center of the city, appears to be satisfactory for best serving the community. However, the inadequacy of some terminal facilities suggests the need for developing several additional multiple-company terminals.

Trade in food products had an early start in the Wholesale Terminal District. This resulted from the designation of Superior Street between Monroe and Washington streets as a market place in the original town plat (Fig. 5).¹ The area no longer serves its original purpose, as traffic would be greatly hampered by the mid-street stalls and pedestrian congestion. Replacing this trade center is a municipally-owned wholesale and retail market several blocks away at the south end of Huron Street (Fig. 20).² A high degree of localization of fruit and vegetable com-

¹As shown in Fig. 20, the street in this block is considerably wider than in adjacent blocks.

²About 1,650 individuals are registered for stalls here. There is a daily average of about 150 loads during the growing season. Interview with Mr. Charles Weber, Superintendent of Wholesale Market, Toledo.

mission houses occurs along Huron Street from the market to Monroe Street. This area is a beehive of activity in the early hours of the day, but by mid-afternoon the streets are vacant. One particularly large wholesale vegetable outlet is the Toledo Hothouse Cooperative Association. Although produce is sold to local dealers, more than three-quarters of the total is shipped to a market extending throughout the Middle West but particularly to Detroit and Cleveland. Toledo is one of the largest centers in the United States for the growing of hothouse vegetables.¹ Tomatoes, leaf lettuce, and cucumbers account for most of the production with Toledo ranking as the second largest hothouse tomato center in the country. About 1,000 persons are employed from October to August in the growing and harvesting of these crops.²

Wholesale grocers migrated to or near the Washington Street area largely during the interurban era. Some of these dealers in staple goods had started as retailers in the vicinity of Summit and Monroe streets. As business expanded, they began selling in quantity lots. The choice of new sites nearer the rail and interurban terminals, for receiving and distributing large orders, was a logical result. At a later date, with better means and changing methods of distribution, large-scale wholesaling in Toledo began to decline. The wholesale grocery field exemplifies this, for only three major general-line companies remain. Formerly, several of the wholesale grocers were important processors, and their brand names were known widely.

Two national meat distributors, which located among the wholesale grocery houses, chose sites along the rail right-of-way leading into this area. Such locations are expedient for the handling of carload lots of goods under refrigeration. New methods of packing house distribution have reduced the service areas of these outlets.³ There are several local meat wholesalers, but

¹Lucas County, with over 3,000,000 square feet (about 74 acres) under glass, ranks seventh in the nation. In the interior of the country, only Cuyahoga (Cleveland) and Cook (Chicago) counties surpass Lucas. Sixteenth Census of the United States: 1940. Agriculture: Ranking Agricultural Counties (Washington: Government Printing Office, 1943), p. 83.

²Interview with Mr. S. L. Evans, Assistant Manager, Toledo Hothouse Cooperative Association, Toledo.

³The area served by a selected group of Toledo wholesalers is considered in sec. 3 of this chapter.

as these companies also slaughter and process they have located in areas where more land was available, particularly near the north border of the city.

Other types of wholesaling in the District are dispersed among the light manufacturing and storage facilities. However, those which benefit most from downtown business are located chiefly between Monroe and Washington streets. Such light industries as printing shops also have chosen sites near the Central Business District. Products of the combination manufacturing-wholesale companies include baked goods, milk products, feed, wood products, and paints.

Considerable area is given to both indoor and outdoor storage. Indoor storage includes public, wholesale, and department store warehouses. The last named must be near the stores, and this explains their location in the Wholesale-Terminal District. Builders supply yards and junk yards make use of much of the area designated as outdoor storage. Several of the former yards have located along Swan Creek in order to receive sand by shallow-draft scows. Recently this stream's use as a navigable waterway was discontinued, and thus it is no longer necessary for the city to open the bridges for this traffic. The twenty truck and four rail freight houses and accompanying yards also might well be considered as land used for storage. The aggregate of this type of land use is the greatest of any in the Wholesale-Terminal District. The high percentage of horizontal rather than multiple-floor storage is indicative of the relatively low-cost land here.

On the west margin of the district is the city's largest public housing development (Figs. 1 and 20). Although not a part of the area being considered, it is mentioned here as it provides an example of one method of eliminating residential and commercial derelicts which are widespread in the outer portion of the Commercial Zone. The several contiguous projects in this development house a total of 705 negro families.¹

¹There are three other public housing projects in Toledo, all on the East Side (Fig. 1). The number of dwelling units in each are as follows: Weiler Homes, 384 units; Ravine Park Village, 212 units; and Birmingham Terrace, 137 units. Figures provided by the Toledo Metropolitan Housing Authority.

Other Commercial Areas

The outer portions of the Commercial Zone to the west, north, and east of the Central Business District account for most of the commercial activities which have not been considered as yet. This area has much the same general array of activities found in the Wholesale-Terminal District, but there is more interspersed among ubiquitously poor dwellings. Sections of this outer Commercial Zone also show differences in the types of commercial activities.

In harmony with the fact that the frontage along thoroughfares extending westward from the Central Business District is given largely to commercial use is the further fact that automobile display rooms and used car lots especially are prominent along these streets. Locations here have the advantage of nearness to the Central Business District without the high land values and heavy traffic. In addition to the automobile sales business in this western commercial fringe area, there are many garages and specialty shops for servicing automotive equipment. Distributors for electrical appliances, radios, food products, magazines, and many other lines also find this section outside the high-rent district to be desirable. The continued movement of commercial establishments into this area, however, partially will nullify this advantage. Little manufacturing occurs here. Although Toledo has no real apartment house district, this area is a near counterpart made up of numerous but old multiple-dwelling structures.¹

The northern portion of the outer Commercial Zone includes roughly a triangular area between Jackson and Cherry streets and an extension north of Cherry along Summit Street (Fig. 1). In the Jackson segment are a number of wholesalers and supply houses. Several sizable light industries also are located here. Toward

¹Census tracts 27 and 28, which include the Central Business District and extend west to Collingwood Avenue, have a dense population. The per cent of dwelling units in one-family structures here is only 7 and 8 per cent respectively. In contrast, three tracts in different parts of the west border of the city show about 80 per cent of the dwelling units in one-family structures (Sixteenth Census of the United States: 1940. Population and Housing, Toledo, Ohio [Washington: Government Printing Office, 1942], pp. 28-31).

Cherry Street these activities decrease to be replaced by retail stores of low quality. The second floors of most of these structures provide living quarters of sub-marginal worth. Buildings of the Wheeling and Lake Erie, Ann Arbor, and Toledo Terminal railroads mark the limit of the Commercial Zone out Cherry Street. In the section northward along Summit Street to the vicinity of the Pennsylvania Station several special lines of wholesale goods are prominent. These are baked goods, beverages, and paper products. Manufacturing of the first two commodities also occurs here, the baking of bread lending a distinctive and pleasant aroma to the area through a part of each day. Numerous cheap hotels and cafes also are located in this area, which was at one time the commercial center of the village of Vistula, later known as Lower Town.

The remaining portion of the Commercial Zone is a strip along the waterfront between Water Street and the river. As previously mentioned, this is almost entirely made land, having been derived by cutting down the river bluff and filling out to the established harbor line. The area extends from the mouth of Swan Creek to the above-mentioned Pennsylvania Station.¹ In this narrow mile-long section, land is not used very intensively. Figure 19 shows the principal use in the vicinity of the Central Business District is for parking automobiles. To the north, the major utilization is by wholesale fish companies, builders supply companies, and indoor and outdoor storage. The waning of activities and deterioration of buildings in this area bespeak the decline of the waterway as a force in Toledo's development. Future use of this made land for a waterfront park and highway has been suggested frequently. Such a move should bring a returning civic interest in the area--this time from a recreational and transportation standpoint rather than from the viewpoint of commerce.

Section 3. Service Areas of Toledo's Commercial Functions

The primary area of Toledo's trade is largely within the fertile Lake Erie plain. However, the northwestern and southern fringe of the area extend on to the rolling moraines and till

¹The valuation of this waterfront strip (Monroe to Elm Street) in 1946 totaled \$1,645,020. Of this figure, \$677,200 are for buildings and \$967,820 are for land. Compilation from data in assessment volumes of Lucas County Appraisal Department.

plains which border this physiographic region.¹ Although not located in the geographic center of the plain, the city has the most strategic situation with respect to all forms of land transport. Direct routes for interregional commerce have prompted the development of an important regional trade.² As the premier city and the only metropolitan district in the lacustrine plain, Toledo has been aided greatly by the natural wealth and resulting prosperity of the surrounding region called here her service area.³

The limits of the trade area for Toledo cannot be shown by single boundaries.⁴ However, by plotting the service areas of a group of representative commercial functions, one can arrive at a fairly satisfactory trading or service area (Fig. 21). The various boundaries form the transition zone with the area encircled by most of the boundaries having a very definite association with

¹This region approximates the Maumee Valley Area, one of the 235 "Livelihood Areas of the United States," suggested for study by the National Resources Planning Board. However, this publication included Fort Wayne in the area, although it is not within the Lake Erie Plain nor is it within the major zone of Toledo's trade. See U. S. National Resources Planning Board, Area Analysis--A Method of Public Works Planning, by the Land Committee, Revised April, 1943 (Washington: Government Printing Office, 1943), p. 40 and insert map.

²Accessibility, which means convenience, has been maintained with this region. Cf. Eugene Van Cleeef, Trade Centers and Trade Routes (New York: D. Appleton-Century Co., Inc., 1937), p. 93.

³An interesting early recognition of Toledo's service area was the reflection that "while Detroit supplies Michigan, and Cleveland grasps the wealth of northern Ohio, Toledo has seen the opportunity presented by the limited region lying between them and has established itself . . . the opportunity for which it has snatched from Detroit and Cleveland, because nearer than they to the producing [and consuming] territory." Alfred F. Sears, "Geographic Conditions that Make Great Commercial Centers," Bull. of Amer. Geog. Soc., XXX, No. 4 (1898), 293. It might be expected that the Toledo trade area would have been reduced by the larger towns on all sides, but on the contrary it has forged ahead and has at least maintained its territory.

⁴A circle around a trade center may look good on a map, but it cannot be correctly used to delineate a market area. Factors affecting the limits are (1) variation in population density, (2) proximity of competing cities, (3) variation in transportation facilities, and (4) differences in soil productivity. Cf. Marvin Hurley, Chamber of Commerce Administration (rev. ed.; Chicago: National Institute for Commercial and Trade Organization Executives, 1942), p. 187.

the trade center. This primary area covers about 3,400 square miles and has its limits at distances varying from 25 to nearly 50 miles from Toledo. Moving outward, the city's dominance loses force until the outermost lines mark the balance of power with competing major centers.¹ In general, the retail areas are the smaller and have more symmetry of area and coincidence of boundaries than is true for the wholesale services. The uneven and wider distribution of the latter services develops irregular limits and a broader variation in area served.

Before considering the various Toledo service areas, it is well to make a reconnaissance of the population and activities of the center's major zone of trade.² The city and its immediate vicinity had a total population of 363,567 in 1940.³ Although this was a decrease of 1,894 in a decade, the loss was solely within the city. The vicinal portion increased by 6,475 despite annexations of about 5,000 people to the city in this period. A similar condition has been cited earlier with reference to the Toledo Metropolitan District. Farther afield, in the surrounding counties, the increase continues. The eleven counties nearest Toledo had a population of 737,456 in 1940.⁴ This total can be divided into three groups: (1) rural farm, 152,312; (2) rural non-farm (largely small trade centers), 159,168; and (3) urban (towns over 2,500), 425,976. The densities in the rural portions are largely from thirty to fifty per square mile, whereas, the towns average several thousand per square mile.

Figure 21 shows the distribution of towns having over 1,000 persons in the Toledo trade area. Except for the three suburbs (Maumee, Perrysburg, and Rossford), there are no places of 2,500 within 20 miles of Toledo. Low-lying lake borderlands

¹Cf. Van Cleef, op. cit., p. 36.

²Unless otherwise footnoted, the figures on population and farm values in the following paragraphs are computed from the Sixteenth Census of the United States: 1940.

³The vicinity refers to sixteen minor civil divisions which have a portion of their respective areas within 10 miles of the Central Business District.

⁴This is an increase of 10,189 over 1930. The counties are Lucas, Fulton, Henry, Putnam, Wood, Hancock, Ottawa, Sandusky (all of Bellevue), Seneca in Ohio, and Monroe and Lenawee in Michigan.



Figure 21



to the north and east of the city are conspicuously lacking in anything larger than the cross-roads hamlet. The lack of attractive lakeshore sites discourages summer residents and a prospective seasonal trade. The cities and villages are, in general, along the radial lines of communication focusing on Toledo. They appear "like beads on a string."¹ A survey of the urban units in the general trade area of Toledo shows that with one exception (Bellevue) all towns increased in the decade of the thirties.

Rural and urban activities in the hinterland of Toledo are highly productive and provide the city with a rich market. The agricultural hinterland of the city is the most valuable of any in the State. In 1940, the eleven previously mentioned counties had an average value for land and buildings of \$8,031 per farm or \$88.99 per acre.² Normally these lands are given to a regime of mixed grain farming together with the raising of live-stock and poultry. The principal field crops are corn, soybeans, wheat, and alfalfa.³ Other leading sources of agricultural income are truck farming and dairying. Some of the nation's leading counties in acreage of various agricultural specialties are in Toledo's hinterland. Among the outstanding products are tomatoes, cabbage, sugar beets, peaches, and grapes. The lacustrine

¹See Guy-Harold Smith, "A Population Map of Ohio for 1920," Geographical Review, XVIII (July, 1928), 427. Smith found the average distance between these community centers to be 7.3 miles.

The long deterred settlement of the poorly drained Lake Plain allowed the transportation patterns--railroads and mile-square road system--to dominate the pattern of occupancy. Cf. Alfred J. Wright, "Ohio Town Patterns," Geographical Review, XXVII (October, 1937), 622-24.

²The average for Ohio was \$6,176 per farm or \$65.91 per acre. Of course, single counties which have major cities show a figure higher than the average for the Toledo area.

An exception to the generally fertile lands of the Toledo region occurs in the Oak Openings area west and southwest of the city. Here the land value per acre averages about \$20 to \$25 (Land Value Manual: Lucas County, 1937, p. 47). Polish farmers of northwestern Ohio are found largely in this area where the lower soil fertility is reflected in the appearance of the farmsteads and the economy of the people. See Carl D. Varvel, "Nationalistic Elements in Farming on the Lake Plains of Northwestern Ohio," Ohio Journal of Science, XXXII (November, 1932), 522. There are no clusters of dwellings within the typical oak openings. Cf. Moseley, op. cit., p. 86.

³Cf. Nickel Plate Road, Along the Line in Ohio (Cleveland: Nickel Plate Road, 1944), p. 29.

soils provide a rich base for the first three, while the tempering effect of Lake Erie encourages the shore zone concentration of fruits. In addition, Lucas County ranks fourth in the eastern United States in acreage of crops under glass.¹ The importance of agriculture is reflected in the numerous vegetable and milk canneries and flour and grist mills as well as five sugar beet refineries in the towns of the area.

The urban and rural non-farm populations of the eleven counties previously noted provide two-thirds (31.6 and 35.0 per cent respectively) of the 455,107 persons outside the Toledo limits. With the exception of Rossford, the towns in the immediate vicinity of Toledo are residential. Beyond, in the outer retail and wholesale trade zone, practically every town of a few thousand has several important industries. In addition to the processing of agricultural products, the metal industries--machine shops, foundries, and steel products manufactures--are an outstanding group.²

Quarrying of limestone and dolomite provides another important source of employment in a number of communities in Toledo's service area. Especially notable is the group of towns to the southeast of the city which includes Genoa, Clay Center, Woodville, Gibsonburg, and Luckey. The Niagara dolomite quarried in this area is used for such products as crushed stone, lime, and refractories. At other quarries east and west of Toledo, Columbus limestone and Monroe dolomite are used for crushed stone and Portland cement. The latter product is made from a mixture of limestone and clay. Widespread manufacture of tile and brick also is promoted by the general availability of Lake Plain clays and the need for replacement tiles in order to maintain good drainage in the essentially flat terrain.

Retail Trade

The retail trade area of Toledo extends approximately 50

¹Greater consideration was given to greenhouse products earlier in this chapter (p. 137).

²State of Ohio, Manufacturers Directory, 1944, Labor Statistics Report No. 30 (Columbus: Dept. of Industrial Relations, 1944) contains listings of manufactures and number of employees by town and by type of industry.

miles from the city except on the north (Figs. 21 and 22).¹ Here the influence of Detroit reduces the distance by about half. The population of this area is somewhat over 600,000 with approximately half of the total in Toledo.

Figure 22 shows the area of active out-of-town charge accounts of Toledo's largest department store.² Although the least competition exists in the area west of the city (Fig. 21), the largest number of accounts are in towns to the southeast. Two reasons for this occurrence are: (1) a number of sizable towns are situated in this southeast sector, but they lack the variety of goods available in Toledo, the principal trade center;³ (2) shopper service in the larger towns attracts additional trade.⁴ In three outlying towns--Maumee, Bowling Green, and Tiffin--the Toledo department stores have established branch outlets.⁵ At a distance of 42 to 45 miles from the city, there is a definite decline in retail sales.⁶ Out-of-town shoppers come to Toledo chiefly by private automobiles. Unlike the great metropolises, Toledo's commercial heart can be reached with relative ease, as

¹Cash and carry buying makes delimitation of the retail trade area difficult.

²Through the courtesy of Mr. L. V. Hagemeyer, Credit Manager of LaSalle and Koch's, in 1944 the author had access to the charge account files of the company in order to tabulate data for the map.

Eighty-eight incorporated places lie within the limit of major trade influence shown on the map.

The number of active out-of-town accounts has increased considerably since data was obtained for Fig. 22. This has resulted from the discontinuance of such war-time measures as gasoline rationing and curtailed delivery service.

³An example is Bellevue, near the border of the retail trade area, 48 miles southeast of Toledo. In this town of 6,000, the retail dry goods stores carry a limited stock of goods, as much shopping is done in Toledo and Cleveland. See Ruth R. Daugherty, "The Geography of the Bellevue Area," Ohio Journal of Science, XLI (September, 1941), 378.

⁴A shopper makes several trips a week to the Toledo store to secure items ordered by local customers. The cities having this service are shown in Fig. 22.

⁵Interview with Mr. R. H. Cromwell, Toledo Better Business Bureau.

⁶Warren Case, "A Study of the Toledo Trading Area in Northwestern Ohio and Southern Michigan," December 3, 1938. (Typewritten.) The major competing stores in other communities

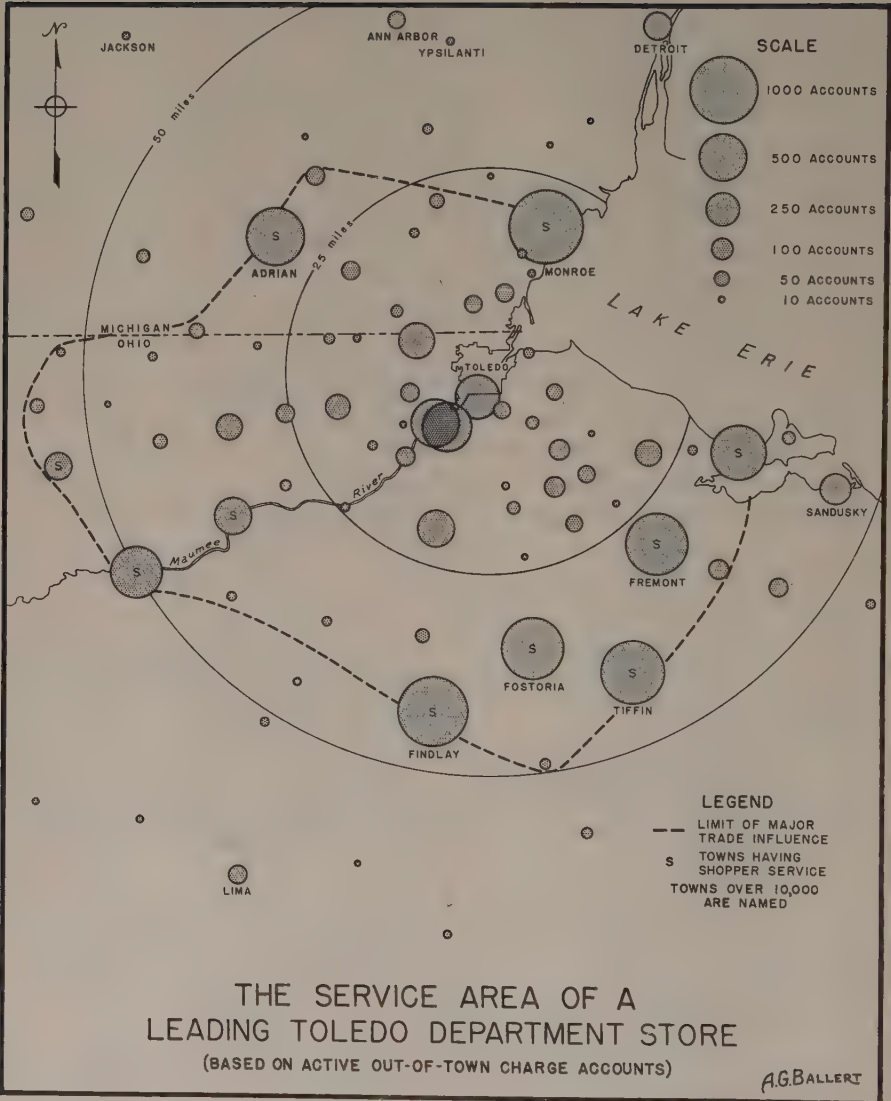


Figure 22

highways from all directions focus on this hub which in no case requires more than a 5-mile traversal of urban development (see Fig. 8). In addition, the expanding bus service to suburban areas has brought an increasing use of this means of transportation.

There is a close correlation of the department store's service area (Fig. 22) with the retail trading areas delimited by the Audit Bureau of Circulations and the Hagstrom Map Company (Fig. 21).¹ The former trading area is the territory in which the Toledo Blade has important coverage. This paper, with the second largest evening circulation in Ohio, is an important means of attracting shoppers to Toledo.²

Another measure sometimes used in locating the boundaries of a trade area--especially that for retail trade--is the coverage area of local radio stations. Although all three Toledo stations, WSPD, WTOL, and WTOP, publish maps showing their listening areas, it would appear that only the territory previously considered as the retail trade area of the city would be measurably affected by this medium of publicity.³

Wholesale Trade

Toledo reaches farther afield in her non-retail trade function. Figure 21 shows the areas served by some of these ac-

are J. L. Hudson Company, Detroit; May Company and Halle Brothers, Cleveland; F. & R. Lazarus, Columbus; and Wolf and Dessauer, Fort Wayne.

¹See Appendix II for source of data of maps. In 1944, the Audit Bureau of Circulations designated new limits for the Toledo Retail Trading Area. County boundaries were followed, thus making census tabulations easier. However, the earlier limits show better the actual zone of retail trade influence, for trade normally does not recognize state and county boundaries. This is further substantiated by an extensive study with accompanying maps made by the Toledo News-Bee Company, The Metropolitan Toledo Market (Toledo: Toledo News-Bee Company, 1936).

²Some of the local newspapers in Toledo's trade area will not take advertisements from Toledo department stores. In order to reach this potential market, the stores distribute shopper newspapers.

³In Chicago, the listening area of station WGN frequently has been used to delimit the trade area of that city. The writer believes that such a criterion is ill-advised here and even more so in smaller cities of northeastern United States where urban centers are closely spaced and station radio coverage shows much overlapping.

tivities. In this group, Toledo's zone of dominant influence extends out about twice as far as in the retail trade. The distance is approximately 80 to 90 miles except in the Detroit sector. Competition from other major centers largely eliminates the broader sectional trade. The features of and changes in this trade are considered later in this chapter.

Changes in marketing methods and means of transportation have reduced Toledo's relative importance as a wholesaler. The four wholesale activities shown in Figure 21, however, have been retained due to the need for frequent replenishment of stocks.

Meats have the smallest service area. Numerous distribution centers and "peddler" cars largely account for the minor size of the area. In addition, the state line acts as a barrier on the north, for meat products processed in Toledo cannot be shipped across the boundary without federal inspection.¹

The wholesale bakery service area is based on the combined territories served by three of Toledo's largest bakeries. All three are branches of national organizations.² A decrease in home baking, even in rural areas, has stimulated this activity.

As a wholesale grocery center, Toledo has had much competition from smaller towns in recent decades. The Census shows this to be the most common wholesale activity in Ohio. To meet competition, one Toledo company established fourteen cash and carry branches within its service area shown in Figure 21. However, all delivered goods are trucked from Toledo.³ The broker and commission merchant who take orders for direct shipment from the manufacturer have cut sharply into Toledo's wholesale grocery business.

Toledo has one major wholesale drug company. The service

¹Interview with Mr. J. F. Pykett, Toledo Manager, Swift and Company.

The Toledo branch of Armour and Company serves only metropolitan Toledo. Outside areas are served by "concentration points" located at Bellevue, Ohio; Fort Wayne; and Ann Arbor. The size of Toledo's plant and facilities will not warrant developing a larger sales area. Interview with Mr. B. P. Rarick, Toledo Manager, Armour and Company.

²One company adds to its production by sending truckloads of goods to Lima, Ohio daily for distribution from that city.

³Monroe and Ann Arbor, Michigan also are served by a Detroit branch. Data secured from Mr. D. W. Blow, Advertising Manager, Lee and Cady, Toledo.

area of this organization approximates that of wholesale groceries in extent, but the coverage is more intense. Reduction in the company's trade area has been chiefly in the Indiana section. Promptness of service is important in the wholesale drug business, for trade names are important and thus there is less possibility of substituting products.¹

The limits of the country bank territory of Toledo's largest financial institution also are shown in Figure 21. Within this area are approximately 100 banks having deposits in Toledo. Such accounts encourage trade to the same center.²

The area which supplies Toledo's fresh milk also provides a rural focusing of interest on the city. This territory has expanded with Toledo's growth and with improved transport facilities.³ Within the milk shed (Fig. 21), farms are inspected by the Toledo Board of Health.⁴ Only inspected farms can send milk to the urban center. In 1939, Toledo depended upon about 2,300 farms for its milk supply.⁵

In the hardware field, Toledo probably has its largest wholesale service area. This includes the southern peninsula of Michigan except in the vicinity of Chicago, all except the north-eastern corner of Ohio, northeast Indiana, and the northern part of West Virginia. Shipments are less frequent than in the fore-mentioned wholesale activities, but the orders are large. The advantage of rail and truck line transport in all directions,

¹An average druggist carries about 6,000 items and these only in small quantities. The wholesale druggist has from 30,000 to 50,000 items. Interview with Mr. A. B. Ziegler, Vice President, Walding, Kinnan and Marvin, Toledo.

²Information from Mr. J. D. St. John, Vice President, Toledo Trust Company.

The Toledo Trust Company ranked sixty-ninth among the banks of the United States and fourth among those of Ohio in deposits on December 31, 1945. See The American Banker, January 31, 1946, p. 25.

³At the turn of the century, there were twenty cheese factories in the area west of Toledo (J. A. Bownocker, Dodge's Geography of Ohio [Chicago: Rand, McNally & Co., 1906], map on p. 19. Today none of the factories remain, but in their place are a half-dozen concentrated milk plants (Nickel Plate Road, op. cit., map on p. 50).

⁴Data secured from Dr. C. C. Hunt, Toledo Board of Health.

⁵The farmer's lack of interest in dairying as a major

without need of transfer enroute, promotes Toledo as a center for this activity.¹ In fact, the wholesalers contacted were practically unanimous in their high regard for the city's position as a distributing center.

Other lines investigated had a general coincidence of boundaries with one of the group of wholesalers mentioned above. An outstanding feature is the barrier effect of the state line to certain service areas. Examples are the electric company and gasoline tank truck distribution. In both instances, tax difficulties reduce the distribution on the north to the few square miles between the city limits and the Michigan boundary.

Another group of wholesalers is the manufacturers' sales branches. Most of these organizations carrying specialized lines have a definite territory allocated to them from the company headquarters. These limits usually follow convenient political boundaries.

National and International Trade

Toledo's trade with areas beyond the hinterland is not served to any extent by the retailers and wholesalers but, instead, by the manufacturers. Without this broader market, the major industries could not exist. However, the city's largest single market is the nearby Detroit district.² The principal products sent to this area are the non-consumer goods--automotive parts and accessories. Although many such products are not known widely by the public, they weigh heavily in the total trade of Toledo.

Markets for other than the automotive industry are much more widespread. Nevertheless, the territory is not universal

livelihood is reflected in this large number of farms required for a daily production of about 32,000 gallons. This does not include such products as butter, cheese, and ice cream. In comparison, St. Louis, with a population of over 800,000, requires but 3,700 farms to supply its needs. See Warren P. Hall, "The Present Milk Problem of the Toledo Distribution Area" (Unpublished Master's thesis, University of Toledo, 1939), pp. 1-3.

¹Interview with Mr. E. J. Slow, Vice President, Bostwick-Braun Company, Toledo.

²The close proximity of Detroit, Cleveland, Chicago, etc., which gives the Toledo retailer and wholesaler much competition, proves a benefit in the marketing of Toledo manufactures.

for here again the products are largely of the non-consumer type. Instead of mere numbers of people, such factors as type of economy and buying ability are of primary significance. Examples of the non-consumer products are plate glass, scales, elevators, drill machines, and industrial furnaces. Such goods find their major demand from the American Manufacturing Belt in which Toledo has a most favorable location. Among the consumer products are atomizers, glassware, electrical appliances, spark plugs, paints, coffee and spices, canvas goods, umbrellas, and automobiles. Branch sales offices have been established throughout the United States by nearly all of the leading manufacturers.

In the field of international trade, Toledo has about a score of important exporters. Their major markets are in Latin America and Canada. Russia has provided a considerable market for machinery producers. About half of the exporting companies have world-wide interests. An example of strong regional competition appears in the glass industry. Because of the weight of the products and the high development of the activity in Europe, that continent largely is eliminated as a market.

One of two factors underlie nearly all of Toledo's major exports--uniqueness or wide reputation of the product. Examples of the former are dental and surgical equipment and of the latter are scales, spark plugs, and automobiles.¹ Exports are made largely through the port of New York. The high percentage of financial arrangements for export sales handled here encourages the movement of goods to the same port for shipment.

¹The Willys-Overland exports about 17 per cent of its output of autos, but plans call for raising this to 25 per cent. The ability of this car in rough country and the low gas consumption make it an excellent vehicle for many parts of the world. See "Willys-Overland," Fortune, XXXIV (August, 1946), 186.

CHAPTER IV

THE MANUFACTURAL FUNCTION

In Toledo, the manufactural function is the principal source of the community's prosperity, having replaced the commercial and transportational functions (chaps. ii and iii) in this respect shortly before the turn of the century. In recent years, moreover, various phases of this function have been responsible for the city maintaining its rank among the growing American cities and for keeping the name of Toledo before the nation. As manufacturing is the major source of employment in the area, dependence of the city upon the strength and continuance of its industrial activities is great. Conversely, high dependence of the manufactural function on the situation, resources, and cultural momentum of Toledo and its tributary areas also is great.

It will be remembered that a position at the southwestern corner of Lake Erie encouraged land and water transportation agencies to focus their routes upon the city (chap. i). A favorable climate, rich soils, level terrain, and boundless supply of water are among the principal local conditions which directly or indirectly have aided in attracting manufacturing and the manpower necessary for its operations. Situational advantages, however, were needed for Toledo to realize the fullest manufacturing benefits from these local features. Outstanding in this respect is the city's strategic relation to (1) the American Manufacturing Belt, particularly the city's middle position in that belt; (2) the major areas of iron and steel production in the country; (3) the central district of automobile production (contiguous sections of southeastern Michigan, northeastern Indiana, and northwestern Ohio); (4) the agricultural, mineral, and forest resources and production of the interior lowland; and (5) the center of population of the United States. In addition, Toledo's early start in manufacturing (about 1880), the success of foundry and machine shop production and other pioneer factory enterprises, and the continuing progress of glass and refinery industries have

created an industrial climate which gives momentum to the entire manufactural structure. To these advantageous qualities have been added effective transportation facilities, a group of complementary industries, and a reasonable tax structure. They have affected the manufactural function in many ways. Furthermore, the various manufacturing activities strongly have affected the community through the skills developed, remunerations paid, stability of employment provided, and the localization of industry in certain parts of the city's pattern.

Today, the Toledo area stands as one of the thirty-three districts in the United States which are termed "industrial areas."¹ Among these, in 1939 Toledo ranked thirty-third in number of wage earners, twenty-ninth in total value of products, and twenty-ninth in total value added by manufacture. The area also ranked twenty-ninth in total population. With respect to other industrial areas, Toledo's position is most outstanding if measured by the horse power installation per 100 wage earners. The community ranked seventh among the group on this basis. As a user of gas, Toledo stood eighteenth.²

To some, Toledo exists primarily as an automobile manufacturing satellite of Detroit, like Pontiac and Flint.³ This is a false idea, for a comparison of the ratio of the number in the group engaged in the manufacture of automobiles and automobile equipment to the total engaged in manufacturing in each city in 1940 shows Pontiac and Flint with 88.5 and 87.5 per cent respectively, whereas, the figure for Toledo is only 24.7 per cent.⁴ Further qualification is needed, however, for the other manufacturing groups in Toledo ship a considerable portion of their output to the Detroit area. Nevertheless, Toledo possesses large

¹There are ninety-seven counties included in these industrial areas. Each of the areas had more than 40,000 factory wage earners when they were established in 1929. The Toledo Industrial Area includes only Lucas County and, as such, it is one of the smallest areas of the group in size and in industrial employment.

²Sixteenth Census of the United States: 1940. Manufactures, 1939, Vol. I, pp. 50, 332, 352.

³An example of such thinking appears in Graham Hutton, Midwest at Noon (Chicago: University of Chicago Press, 1946), p. 161.

⁴Sixteenth Census of the United States: 1940. Population, Vol. II, Part III, pp. 887, 903; Part V, p. 735.

and unique industries which enjoy markets in other fields and in other sections of the nation. Toledo thus is far from a one-industry town.¹

Section 1. Evolution of the Manufactural Function

In general, the rise of the manufactural function to its present prominence in Toledo followed a pattern somewhat similar to that of many cities in the Middle West. In specific cases, the similarity has been strengthened by the fact that certain manufacturing activities also have followed a sequential development akin to that in other urban centers. These contentions may be illustrated by a brief survey of the principal industrial activities at different periods in the city's development.

In early Toledo, manufacturing was relatively unimportant as compared with trade. However, the combination of canal and lake transportation which encouraged trade, also encouraged manufacturing. Grist mills and saw mills were among the embryonic industrial enterprises.

Grist milling was associated with the movement of grain to Toledo, at first by the canal, but soon thereafter by the pioneer railroads. Much of this grain was shipped eastward via the lake, but some of it was ground for the local market. At times, moreover, flour was shipped by lake and probably was hauled in wagons to interior points.

The saw mills were part of the activities which made Toledo a sizable although never a great lumber center. The Maumee Basin originally was heavily timbered with fine hardwoods. Oak was abundant, and oak logs were rafted down the Maumee to Toledo. Logs of softer wood were needed to help float the heavy oak. When these rafts were dismembered at Toledo, the oak was shipped by vessel, some even going to Britain. The lighter woods found a market at Toledo, although they were not valuable enough to be shipped beyond this point.² The softwoods and some of the oak were sawed in the local mills. In addition, white pine from the Michigan pineries was rafted from Lake Huron down the St. Clair

¹For brief but concise summaries of Toledo's principal industries see Moody's Manual of Investments. Industrial Securities: 1945 (New York: Moody's Investors Service, 1945).

²See Slocum, op. cit., p. 541.

and Detroit rivers and then towed along the lake shore to the Toledo mills.¹ This fine quality lumber was in great demand for building homes and barns in all of the area tributary to Toledo. The early saw mills were located along the riverfront, where they could be reached from the river, canal, and lake and where there was quiet water to boom the logs.

In 1860, flour, clothing, and wood products, all basic needs of the community, were the leading manufactures in value.² Other relatively simple manufacturing enterprises, such as brewing and tobacco processing, arose, but in 1870 employment in various phases of the lumber and wood products industry in Lucas County accounted for 914 persons of the 2,204 engaged in manufacturing.³ From this time until the end of the century, the Lake States were the center of the nation's lumber production with both hard and soft woods being cut at a rapid rate.

The industries of the period, although small, helped to pay for eastern imports by providing commodities for sale and exchange. The Civil War, however, brought shortages in east coast manufactures, with the result that Toledo entered into the general manufacturing field with a broader distribution of products. Among the first of the companies to gain wide recognition was the Milburn Wagon Company, established in Toledo in 1875.

After 1880, the expansion of some manufacturing establishments and inception of others brought the manufactural function strongly into the Toledo scene. A steady development took place in the iron and steel industry with the expansion of foundries,

¹Charles S. Van Tassel, Story of the Maumee Valley, Toledo, and the Sandusky Region, Vol. II (Chicago: S. J. Clarke Publishing Co., 1929), pp. 1368 f.

It is unlikely that very much of the Michigan timber was brought to Toledo by raft due to the turbulence of Lake Huron and Erie.

As early as 1849, a steam barge was built in Toledo to be used largely in bringing lumber from Saginaw (Slocum, op. cit., p. 481).

²See John M. Killits, Toledo and Lucas County, Ohio, Vol. I (Chicago: S. J. Clarke Publishing Co., 1923), p. 421.

At this Census, the number of persons in manufacturing in Lucas County was 1,258. Twenty per cent (249) of this total was employed in saw mills and making wood products (Eighth Census of the United States: 1860. Manufactures [Washington: Government Printing Office, 1865], p. 463).

³Ninth Census of the United States: 1870. Statistics of Wealth and Industry, Vol. III, pp. 557, 716.

machine shops, and metal products plants. Bicycles and children's vehicles were among the products. The Gendron Wheel Company became world-famous in the production of these articles. Two other important industries initiated in the late 1880's were glass-making and petroleum refining. An increased complexity of operations, which required additional skills, rather than a marked rise in employment introduced the industrial era (See Table 1).

After the first decade of the 1900's, manufacturing employment passed from the stage of substantial to one of phenomenal increase.¹ The motor vehicle, together with its numerous subordinate industries, largely was responsible for the rapid employment gains in the decade between 1910 and 1920. From 1909 to 1915, the Willys-Overland, Toledo's sole producer of finished automobiles, increased its employment from 250 to 15,000.² Toledo added 74,667 to its population between 1910 and 1920.

The interval between the two World Wars, from 1919 to 1939, was a transitional period in the industrial life of Toledo. During the first decade, the automotive industry continued to dominate the city's industrial horizon. In 1929, the wage earners in manufacturing reached an all-time high, numbering over 49,000 for the city. However, by 1933 the depression had reduced the figure to less than half of this total.³ From this low point un-

¹The acceleration of employment in manufacturing is shown by the following four Census figures: 1890--10,313; 1900--16,661; 1910--22,628; 1920--48,776. Data from the Compendium of the Eleventh Census: 1890 and the Census volumes on Manufactures for the other dates.

²Kennedy, op. cit., p. 67.

³Although normally there is a slump in the automotive industry in the latter months of the year, from February to December, 1929, the Willys-Overland employment dropped from nearly 26,000 to about 8,000 (from MS records in files of Industrial Department of Toledo Chamber of Commerce). One writer gives the decrease incorrectly as about 28,000 to 4,000 (Beulah Amidon, "Toledo: A City the Auto Ran Over," Survey Graphic, XVI [March, 1930], 656).

McLaughlin points out that the very high percentage of gain in number of wage earners in Toledo from 1919 to 1929 was entirely a result of the cyclical upswing from 1927 to 1929. Of all industrial areas, Toledo reported the greatest rise between these two years (29.8) and also the greatest fall from 1929 to 1931 (-40.8). See Glenn E. McLaughlin, Growth of American Manufacturing Areas, University of Pittsburgh Bureau of Business Research Monograph No. 7 (Pittsburgh: University of Pittsburgh, 1938), 117.

til 1939, employment showed sporadic changes with a gradual overall gain. This slow growth was accompanied by the realization that more diversification was needed both in established and new industries. Although markets were acquired in other than the automotive industry, the diversification continued in the production goods field with little advance into the consumption goods industries. Another phase of the transition period was the trend toward decentralization of industry. Established companies began to set up branch plants and to relocate beyond the city limits. Newcomers also chose peripheral sites.

From 1940 to 1945, Toledo's industrial production and employment were affected strongly by the world conflict. The three major industries established during this period and all of the increased manufacturing employment in other industries went toward the war effort. After the war, two of the three war-born plants discontinued operations and industrial employment diminished considerably.

Toledo has not offered manufacturers free sites, free plants, or special considerations with respect to taxation as have some cities.¹ Thus, financial inducements, which might lead companies to choose Toledo rather than a location elsewhere, have not been used. This policy appears wise for the sound economic development of the community. Toledo thus is content to rest its case on its fundamental long-run advantages.

¹Toledo's tax rate for 1945 was \$19.20 per \$1,000 assessed valuation. This assessed value is based on 100 per cent of the true value of the property. Although many cities make assessments on only a portion of the true value, Toledo's tax rate is low in comparison. Of the ninety-three cities having a population over 100,000, only thirteen have a lower actual payment. Examples of nearby major cities are Detroit, \$34.41; Cleveland, \$29.80; and Chicago, \$39.70. See Volker Fellows, "Tax Rates of American Cities," National Municipal Review, XXXIV (December, 1945), 553-57. This data is published yearly in the December issue.

In March, 1946, a one per cent payroll tax was established in Toledo. This is the second city in the United States to use this method of taxing which reaches every enterprise and person earning his livelihood within the corporate limits. The affect of the tax upon industrial location is not known at the time of this writing. However, a number of industrialists have given their support to this procedure for gaining revenue to better operate the city.

Section 2. Employment Structure

Manufacturing, which supported directly over 36 per cent of the gainfully employed in the Toledo Metropolitan District in 1940, outweighs in importance any other economic function.¹ As it plays such a predominant rôle in the economy of the community, it is worthy of examination in some detail.

Of the areal units which can be used in measuring and characterizing the employment phase of Toledo's manufacturing function, three, namely the city, the metropolitan district, and the industrial area (Lucas County), each have some advantages and some shortcomings.

(1) The city is the area for which the most detailed census data are available, but it does not include all of the community's manufacturing establishments.

(2) The metropolitan district provides the best coverage of manufactural employment in the Toledo area, but information on production and number of wage earners is not available.

(3) The industrial area (Lucas County), for which data appeared in the Sixteenth Census of the United States: 1940. Manufactures, 1939, is an area frequently used. Although statistics from this source provide the number of wage earners, value of products, and value added by manufacture, they do not allow for comparison with urban units which are not in industrial areas. Also the county unit, especially in the case of Toledo, does not encompass all of the relevant industries of the community. In order to draw upon all available information and to present as complete a picture as possible, each of the three areal units has been considered, but only one is used at a time. This facilitates comparison but does not ignore the entity of each unit area.

Major Normality Employment

In Toledo and the surrounding eight minor civil divisions which comprise its metropolitan district, there were 43,034 per-

¹Manufacturing provided a living for 41 per cent of all male workers and for 24 per cent of the employed females (Sixteenth Census of the United States: 1940. Population, Vol. II, Part V, p. 778).

sons engaged in manufacturing in the spring of 1940.¹ Of this total, 35,260 or 82 per cent were males. At this time, Toledoans accounted for 83 per cent (35,671) of the manufacturing employment of the metropolitan district (Table 4). In 1939, over 90 per cent of the employment in manufacturing establishments in the industrial area was in plants within the city.²

Among the major groups in manufacturing, those directly associated with production--craftsmen, foremen, operatives, and laborers--accounted for 25,673 or 72 per cent of the total employed in this activity in the city.³ Another important group in manufacturing--clerical and sales workers--numbered 6,189. Only the 8,969 similar workers in the retail and wholesale trade surpassed this figure among all other occupations in Toledo's various activities, called "industries" in the Census.

An analysis of employment in Toledo's major manufacturing groups perhaps best indicates the relative importance of the various activities and the degree of diversification in the manufacturing functions of the city.

The primary breakdown of employment is into two groups, the durable and the non-durable goods.⁴ In both the city and Metropolitan District, 70 per cent of the persons in manufacturing are in industries making durable goods.⁵ In this respect, Toledo is similar to Cleveland with a figure of 69 per cent. In compar-

¹As this was more than one and one-half years before the United States entered the recent war, it is taken as a period of comparative normality.

²Based on the number of wage earners and salaried employees in the two areas (Sixteenth Census of the United States: 1940. Manufacturers, 1939, Vol. III, pp. 798, 811).

³Sixteenth Census of the United States: 1940. Population, Vol. III, Part IV, pp. 814-15.

⁴The major kinds of manufactures considered as durable goods include wood products; stone, clay, and glass; metals; machinery; and transportation equipment. This grouping is based on that used by the Regional Plan Association, The Economic Status of the New York Metropolitan Region in 1944 (New York: Regional Plan Association, Inc., 1944), p. 23.

⁵In 1930, of more than 49,000 engaged in manufacturing in the city, about 73 per cent were in the production of durable goods. Computed from Fifteenth Census of the United States: 1930. Population, Vol. III, Part II, p. 515. The Census publication Manufactures, 1929, Vol. III, p. 424 only shows the total for all industries.

ison, the percentages employed in durable goods industries in the Detroit and Cincinnati metropolitan districts are 84 and 44 respectively.¹ Thus we find Toledo is a city of moderately heavy industry, producing durable goods principally for the non-consumer market. Proximity to iron and steel production together with primary raw materials on the one hand and a nearby market for producer goods on the other largely explains the city's principal industrial activities.

Though the predominance of durable goods suggests the possibility of diversification in the non-durable field, the writer believes that broadening the community's manufacturing base will be done chiefly by adding new durable lines of goods.

Based on employment figures for 1940, Toledo's largest four industry groups--all producers of durable goods--are in order of rank: (1) automobiles and automobile equipment; (2) machinery; (3) stone, clay, and glass products; and (4) iron and steel products. Together they accounted for 28,253 jobs or two-thirds (66 per cent) of all persons employed in manufacturing in the Metropolitan District. It should be noted that three of the four groups are largely or entirely a metal working process.

Toledo, like Detroit, has its largest employment in the automobile and automobile equipment industry. However, in Toledo only one-quarter of the manufacturing employment thus was engaged in 1940, whereas, in Detroit 64 per cent found their work in this activity. Nevertheless, several of the other principal industrial groups in Toledo also find a considerable proportion of their number employed in making products destined for the automotive industry.

The machinery industry, which ranks second only to the automobile and automobile equipment industry in size of employment, is an example of goods closely allied to automobile production.² Another is the tools used in making this machinery. A

¹Sixteenth Census of the United States: 1940. Population, Vol. II, Part III, p. 913; Part V, pp. 758, 763, and 778.

²Employment in the making of electrical machinery, apparatus, and supplies increased more from 1919 to 1929 than any other manufacturing industry. See McLaughlin, op. cit., p. 195.

In Toledo from 1930 to 1940, the manufacture of electrical machinery was one of the few industries to show a gain, increasing from 1,194 to 1,738 (Fifteenth Census of the United States: 1930. Population, Vol. III, Part II, p. 515 and Sixteenth

considerable portion of Toledo's fourth ranking activity in employment--iron and steel and their products--is devoted to the production of tools and dies. Of these equipment trades, those associated with the automobile have expanded most rapidly during the past few decades as a result of the increasing complexity of factory processes.¹

The glass industry has been among the city's most stable major users of industrial manpower. In 1940, 92 per cent or 3,938 persons of the total employed in the stone, clay, and glass products industry in Toledo were in the latter phase of this activity.² Offsetting the numerous labor-saving devices in this industry have been the continual introduction of new products with resulting increases in employment. This feature also has served to reduce significantly the dependence upon the automotive industry. Several of Toledo's recently developed industries which are subsidiaries of glass companies are mentioned later in this chapter.

Petroleum refining is the only other industry which warrants special mention. Toledo ranks first in Ohio in this employment with 1,454 persons thus engaged in 1940. This activity accounted for 97 per cent of the total employed in the petroleum and coal products industry of the city.³

Census of the United States: 1940. Population, Vol. III, Part IV, p. 765).

¹See McLaughlin, op. cit., p. 223.

²Sixteenth Census of the United States: 1940. Population, Vol. III, Part IV, p. 765.

In April, 1940, the two glass companies in the Metropolitan District employed 4,647 persons in their plants. Accordingly, over 700 were employed in Rossford, the glass-making town adjoining Toledo. Data secured from MS records of the Industrial Commission of Ohio, Division of Safety and Hygiene, Mr. F. W. Klett, Field Engineer, Toledo.

³Computed from figures in Population, Vol. II, Part V, p. 735 and Vol. III, Part IV, p. 765. Employment in the petroleum industry of the Metropolitan District is not available, but for petroleum and coal products the total was 1,927 in 1940. By using the same percentage as above, the approximate number in the petroleum industry would be 1,870.

According to data secured from MS records of the Industrial Commission of Ohio, employment at the four Toledo refineries totaled 1,322 persons in April, 1940. The office staffs and other workers for these companies would bring this figure up to the Census total.

Several additional industry groups, such as printing and publishing, food products, and textile products each employ over a thousand persons, but they are not considered here as their percentages to the total manufacturing employment are relatively small. Furthermore, the size of the former two groups is normally proportional to the population of the city and its environs.¹

In April of 1940, a survey of Toledo industries showed eight companies having more than 1,000 employees.² The total personnel in these plants was almost 15,000. At the same time, there were eleven additional plants employing more than 400 persons each. The total for this group was over 6,600. The grand total employment for the nineteen companies (21,600) was almost exactly half of the number engaged in manufacturing in the Toledo Metropolitan District.³

War-Time Employment

Toledo, like other American industrial cities, showed a rapid rise in manufacturing employment during the war. At the peak of war production, this employment was more than double the 1940 figure. An influx of workers from many areas was necessary to augment the city's labor force. However, this increase was not so great that the city's pattern of life was disrupted such as was the case in some industrial communities.⁴

In 1940, the manufacturing employment in the Toledo Industrial Area was approximately 42,000 (Table 16). By November,

¹In number of establishments in the Toledo Industrial Area, however, these two industry groups (1 and 8) accounted for 185 or 37 per cent of the total (Manufactures, 1939, Vol. III, p. 813).

²The companies in order of employment were (1) Electric Auto-Lite, (2) Libbey-Owens-Ford, (3) Willys-Overland, (4) Libbey Glass, (5) Spicer Manufacturing, (6) Doehler Die Casting, (7) Champion Spark Plug, and (8) DeVilbiss. Data secured from MS records of the Industrial Commission of Ohio.

³The reader is cautioned that data in this chapter, which is based on individual company reports to the Industrial Commission of Ohio, are principally of employment in the manufacturing process rather than of total employment. Thus the full influence of the companies and activities is somewhat greater than indicated.

⁴No war-time housing projects developed in Toledo such as were necessary in many industrial centers.

TABLE 16

TOLEDO INDUSTRIAL AREA EMPLOYMENT: 1940, 1943, AND 1944*

Type of Employment	April 1940	Nov. 1943	Sept. 1944
<u>Manufacturing</u>	<u>42,000</u>	<u>84,000</u>	<u>84,000</u>
Aircraft, Autos and Parts	10,400	20,600	22,200
Machinery	7,500	20,600	19,300
Ordnance and Accessories	...	8,100	8,700
Stone, Clay, and Glass Products	5,000	7,000	7,300
Other Industries	19,100	27,700	26,500
<u>Other Non-Agricultural</u>	<u>56,000</u>	<u>57,000</u>	<u>55,000</u>
Total	98,000	141,000	139,000

*Excluding agricultural employment.

Source: U. S. Bureau of Labor Statistics, Impact of the War on Employment in 72 Centers of War Activity (Washington: Bureau of Labor Statistics, 1945), p. 34. (Mimeographed.)

The U. S. Employment Office in Toledo made employment estimates during each of the war years. The author, however, has chosen to use the above statistics, as the estimates for manufacturing are more conservative and more widely known though perhaps they have no greater validity.

1943, this had increased to 84,000. However, the civilian population for the industrial area at this latter date was set at 336,396 or a decrease of nearly 8,000 below the 1940 Census figure.¹ The number withdrawn into the armed services by November, 1943 was approximately 25,000.² To reduce this large loss of population to the 8,000 figure required an in-migration of 17,000 persons by that time.³ Despite this substantial group of new-

¹The 1943 population estimates were based on the registration for War Ration Book 4. By July, 1945, the estimated civilian population of the industrial area was 345,000, a figure slightly above the 1940 total. Data for 1945 from estimates of the U. S. Employment Office, Toledo.

²This figure had increased to 35,000 by July, 1945. Both estimates are from the U. S. Employment Office, Toledo.

³Based on the U. S. Employment Office, Toledo estimates for July, 1945, there was an in-migration of more than 35,000 by that date. The writer believes this figure is too high and suggests 25,000 as more nearly correct.

comers, they could only account for about 40 per cent of the increase in manufacturing employment if all entered this activity. The remainder of this doubled employment was drawn from previously unemployed or public works employees, non-manufacturing personnel, housewives, and over-age persons and students.¹

Fourteen manufacturing establishments were employing over 1,000 persons by March, 1944. The total employment in these plants numbered 50,710.² In April, 1940, this group had employed about 17,500 persons. The percentage of persons in these industries to the total in all manufacturing in the industrial area increased from 41 per cent to about 60 per cent between the two dates.

Toledo's automotive industries accounted for a major portion of the war-time employment in manufacturing. These industries could produce materials for a mobile war with a minimum of change in equipment. Among the companies producing automobiles and parts in peacetime, there were five which ranked among the half-dozen leaders in industrial employment in 1944 (Table 17).

TABLE 17

EMPLOYMENT IN FIVE RANKING COMPANIES ASSOCIATED WITH
THE AUTOMOTIVE INDUSTRY: 1940, 1944, AND 1946*

Company	April, 1940	March, 1944	March, 1946
Willys-Overland	1,969	15,815	5,757
Electric Auto-Lite	3,892	6,489	5,600
Spicer Manufacturing	1,138	5,747	4,203
Doehler-Die Casting	1,130	3,660	1,484
Champion Spark Plug	1,100	3,200	2,458
Total	9,229	34,911	19,502

*Source: MS records of Industrial Commission of Ohio.

The Willys-Overland, makers of the famous "Jeep," had the

¹In 1940, the unemployed and public works employees totaled 27,736. The U. S. Employment Office in Toledo estimated this group at only 500 in November, 1943.

²Data from MS records of Industrial Commission of Ohio. This source provided nearly all of the employment statistics for individual companies used in this section.

most remarkable war-time gain in employment. It should be noted, however, that a considerable portion of the workers were occupied in producing ordnance supplies such as shell casings and powder magazine elevators. Though the company's employment greatly increased in the war years, it still remained far below the 1929 figure.

The Electric Auto-Lite and Spicer plants also used a sizable portion of their increased employment in the manufacture of non-automotive products. These additional activities necessitated large plant expansions by both companies. The Auto-Lite accomplished this by erecting a new plant adjacent to the north city limits on the site of a former airport.

Most of the other Toledo industries experiencing large increases in employment during the war were in some phase of the manufacture of iron and steel products. This includes such companies as the Interlake Iron Corporation and Toledo Shipbuilding Company, whose names indicate their products, and the National Supply Company, Unitcast Corporation, and American Can Company. One manufacturer of non-ferrous products that had a large employment increase during the period under consideration was the Bunting Brass and Bronze Company.

Toledo's important glass and petroleum refinery industries had little effect upon the war-time employment of the community, although both groups had some increase. The introduction of products such as bomber noses, self-sealing fuel tanks, and butadiene for buna rubber required additional labor.

The three principal manufacturing establishments begun in Toledo during the war all were associated with aircraft production. By March, 1944, their combined employment was 3,852. Though only one of these three companies (Packard) continued in Toledo after the war, the plants of the other two soon were acquired by other manufacturers. It was indeed fortunate that these war-induced industries did not draw a greater number of workers to the Toledo area. Actually, these plants strengthened the city's post-war economy by providing ready floor space for expanding industries.

In summarization, Toledo's manufacturing plants had a peak war-time employment which was more than twice the 1940 total. Despite the large increase in this activity, there was no correspondent rise in the total civilian population of the industrial

area. According to government estimates, there actually were fewer persons in Lucas County in November, 1943 than at the time of the last Census.¹ Though this date was near the peak of industrial employment, the civilian population continued to expand for some time thereafter. By the middle of 1945, the total for this body was estimated at slightly above that for 1940, despite 35,000 in the armed forces. Some of these new citizens will remain in Toledo. Returning servicemen probably will more than offset the exodus of other war workers. Thus the problem arises of employment for this excess of manpower.

Manufacturing is the activity of the city which can absorb large numbers of wage earners. The local Committee for Economic Development has estimated the post-war manufacturing employment of the metropolitan area (approximately the industrial area) as about 60,000 persons.² If this figure, which is about 50 per cent above the 1940 total, is attained, it might well provide employment for a goodly portion of the pre-war populace plus the in-migrants who prefer to remain in the community.³ There would not be a great enough employment, however, to attract any substantial number of workers from other areas. The result will be that only a moderate growth in population will occur during the present decade.

Stability of the Aggregate Employment

The prominence of manufacturing as a source of employment in Toledo makes this activity the key to the economic stability of the community. From 1940 to 1944, the percentage of the total employment which was engaged in manufacturing increased from about 36 per cent to nearly 60 per cent. In the post-war period, the figure probably will be in the vicinity of 45 per cent.

It was shown earlier in this section that nineteen companies employed approximately half (21,600) of the persons engaged

¹Youngstown (Mahoning County) was the only other industrial center in Ohio to show a decrease during this period. The primary importance of the basic iron and steel industry in that city, however, provides a situation unlike that in Toledo.

²"Jobs For All," Toledo Business, XXII (May, 1944), p. 14.

³A Gallup poll held in Detroit revealed that half of the in-migrants to that city wished to remain after the war. See Detroit City Plan Commission, Economic Base of Detroit, p. 20.

in manufacturing in April, 1940.¹ The other 480 establishments were relatively small with approximately 390 employing less than 100 persons each.² Fortunately, Toledo is neither a "one-company" nor "one-product" city. From about 1915 to 1930, however, these features were prominent, if not dominant, in Toledo.

Since the "depression thirties," there has been a decrease in employment in the automobile industry. The groupings of industry in the Census publications make it impossible to measure the changes in such closely allied activities as the manufacture of automotive parts and dies. Nevertheless, it is known that a number of the companies comprising this group are diversifying their lines of manufacture. The seasonal variation in employment in these industries does not show a sharp change.

Since the first World War, almost every field of industry has seen the appearance of a few leading companies. Toledo has shared in this trend which brought the city fame and increasing employment in such diverse lines as the production of scales, spark plugs, flat glass, glassware, atomizers, automobiles, and plastics. In addition to these products which bear a trade name of wide reputation, important industrial employment occurs in the production of such specialties as heat-treating furnaces, oil well equipment, metal containers, cotton gloves, canvas goods, and coated textiles.

Among the city's principal industries, several show promise of considerable expansion in the near future. The glass and plastics industries lead in this group. Many new uses for these products assures continued growth.

Although the structure of Toledo's industry warrants considerable optimism, the fact remains that over 70 per cent of the persons in manufacturing are in the durable goods line.³ Unfortunately, such goods are more subject to extreme cyclical fluctuations than are those of the non-durable group. While the pur-

¹In March, 1944, the same group employed 51,758 persons. By March, 1946, employment stood at 36,850. The downtown office staffs of several large companies are not included in these totals.

²Estimate based on a check of industries appearing in Toledo Chamber of Commerce, Toledo Industrial Directory, October, 1942.

³Plastics should be considered a durable goods, though it is a part of the chemical industry which has been classified as non-durable. See Regional Plan Association, op. cit., p. 23.

chase of many durable goods can be postponed when economic reverses occur, the production of non-durables continues with only a slightly reduced volume and employment. Thus Toledo could materially strengthen her employment stability by expanding in the production of consumer's non-durable goods.

In addition to the above-mentioned economic conditions, there is one natural resource--water--which is becoming increasingly important in its relationship to the stability and growth of employment in Toledo. With Lake Erie as a source of supply, the potential quantity of water available for industrial purposes is unlimited.¹ At the present rate of production and consumption, there are over 30,000,000 gallons of surplus filtered water available daily.² This lake water has an average hardness which is only one-half as great in mineral content as that obtained from the Maumee River.³ Such a condition is important to industries, for the removal of boiler scale is costly. Besides the purified water, there are great quantities of raw water used by companies situated along the Maumee River.⁴

Toledo's independence from lowering ground water tables and limited surface water supplies eliminates a hazard which is affecting strongly the industrial development of many communities.

Section 3. Localization of Establishments

Manufacturing establishments in Toledo and its borderlands have localized into four major and several minor areas.

¹In 1945, the largest user of city water was the Willys-Overland with an average daily consumption, based on a six-day week, of 2,975,312 gallons. Computed by author from data supplied by Division of Water, City of Toledo.

²The normal capacity of the Toledo system is 80,000,000 gallons per day. In 1945, the average daily consumption was about 46,500,000 gallons (National Board of Fire Underwriters, "Toledo, Ohio," Bulletin supplement to Report No. 86).

³From 1910 until 1941, the city used filtered river water obtained near the upstream limits of the city. Before 1910, raw water was pumped through the city mains. Interview with Mr. G. E. Laska, Coördinator, Division of Water, Toledo.

⁴It has been estimated that the entire flow of the river is used seven times over by industries before the water reaches the Maumee Bay. Interview with the late Mr. R. W. Furman, Commissioner of Water, Toledo.

Three of these areas of industrial concentration are within the city and form northeasterly-southwesterly belts roughly paralleling the two sides of the Maumee River and the New York Central right-of-way, which leads to Detroit. The fourth major industrial localization is along the northern border of the city, chiefly beyond the corporate limits.

The two maps showing the distribution of manufacturing establishments (Figs. 1 and 23) each have features which might prove misleading to the reader. Due to the scale of the map in Figure 1, only companies utilizing considerable land areas are shown. In Figure 23, the manufacturing establishments are indicated by circles. Although this suitably depicts where workers are concentrated, it does not portray the extent of the land utilized for the manufacturing function.

The Central Belt of manufacturing (Fig. 23) lies west of the river and has the Commercial Zone as its middle portion. The Eastern Belt closely follows the east shore of the Maumee River and although the entire riverfront along this right bank has been zoned for industrial usage, considerable segments remain vacant. The most easily distinguished manufacturing area in the city is the Western Belt, which is aligned with the New York Central Railroad (Figs. 1 and 23). With minor exceptions, this industrial ribbon marks the western extent of manufacturing within the city. The final and most recent manufacturing district to develop is the belt along the northern fringe of the city. Plant sites here still are scattered quite widely (Fig. 1).

Portions of the Central and Eastern belts of manufacturing do not have a marked development throughout their extents. Therefore, only the sections of concentration--the Commercial Zone and the lower river east shore--are given major consideration along with the Western Belt and Northern Industrial Fringe. Several smaller manufacturing clusters are mentioned principally to show their distribution in and about the city.

Railroads entering Toledo from all directions and a belt line completely encircling the center allow for a wide selection of sites for manufacturing. Although light and heavy industries are not segregated, some areas show a dominance of one or the other of these groups.

Development within the Corporate Limits

Until recent years, industry chose building sites largely within the city limits. At present, three of the four major centers of this activity are all or principally within these boundaries.¹ In addition, several smaller developments are clustered chiefly along Toledo's numerous rail lines. Besides these localizations, numerous light industries, such as bakeries, machine shops, laundries, and print shops, are distributed widely in the city, especially in the older sections and along principal thoroughfares.

The Commercial Zone in the Central Belt.--Of the four principal concentrations of industry listed above, light manufactures show a predominance only in the Commercial Zone (Fig. 1). Manufacturing here is intermingled with the commercial activities and low-quality housing which were described in Chapter III as forming the outer portion of the Commercial Zone. In this band of blight between the Central Business District and the residential portions of the city, old buildings, principally of brick, are being used for small industries, nearly all of which employ less than 100 persons. Due to the lack of pressure on the land, few establishments are in lofts. Among the principal kinds of industrial activity are print shops, bakeries, textile goods manufacturers, dairies, cleaning plants, machine shops, chemical manufacturers, and industrial research laboratories. Many of the companies have sales offices at the fronts of their plants. Freight houses and truck terminals in the outer part of the Commercial Zone provide convenient transportation facilities.

An outstanding exception to the rule of small plants in this central portion of the city is the Electric Auto-Lite Company (Fig. 23). Located several blocks north of the area considered as the Commercial Zone, its large employment and close proximity make mention here appropriate. In recent years, this company has ranked first or second in manufacturing employment. The Wheeling and Lake Erie gives this plant, as well as the Libbey Glass Com-

¹In Toledo, the area zoned for light and heavy industry amounts to 30.65 per cent of the total land area, exclusive of streets and alleys. Only 7.64 per cent of the total area or 25 per cent of the area dedicated for industry thus is used. From MS records of Toledo and Lucas County Plan Commissions.

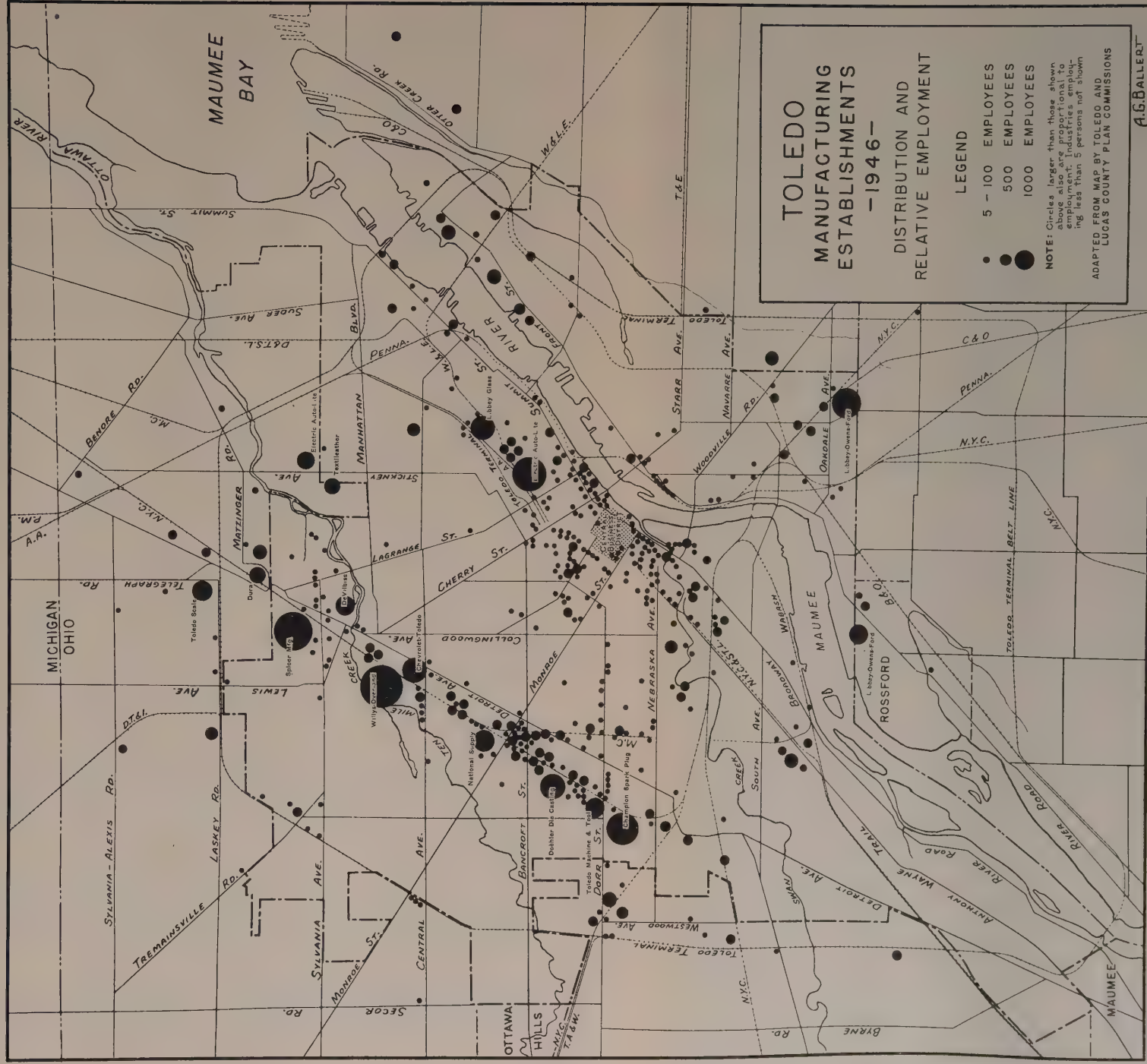


Figure 23



pany to the north, a rail outlet. Need for additional space prompted the Auto-Lite to build another plant north of the city (Fig. 23). The premium placed upon parking space near the original factory suggests one reason for the location of the new plant.

Another structure of interest at the edge of the Commercial Zone is the Toledo Factories Building erected in 1912, at a time when the city's industrial growth was rapid. At present, twenty-one establishments are housed here under one roof.¹ The writer believes that land in the vicinity of this building would provide an excellent site for the development of a central manufacturing district.²

The lower river east shore.--The companies located in the riverfront portions of the East Toledo districts known as Birmingham and Ironville are those engaged in the manufacture of pig iron, coke, ships, flour and feed, and petroleum products (Figs. 23 and 24). This is the oldest grouping of manufacturing plants in Toledo, all of the forementioned activities, except coke production, having been established here by 1891.³ All of the companies, but especially those making iron, coke, and ships or ship repairs, are highly dependent upon the adjacent navigable stream (Fig. 24). Furthermore, the blast furnace company and petroleum refinery use huge quantities of raw river water for industrial purposes.⁴

¹Toledo Directory Company, Polk's Toledo City Directory: 1945 (1945), p. 382.

²Examples of such controlled industrial developments are the Clearing and Central Manufacturing districts in Chicago.

³The Birmingham-Ironville districts were taken into the city in 1872 (Fig. 6).

Although the Toledo Furnace Company, predecessor of the Interlake Iron Corporation was not organized until 1902, an iron furnace was erected here in 1866 (Geological Survey of Ohio, Economic Geology, Vol. V [Columbus: Geol. Survey of Ohio, 1884], p. 458).

⁴The former company uses about 50,000,000 gallons of river water daily. Interview with Mr. J. H. McDaniel, Superintendent, Interlake Iron Corporation, Toledo.

The Toledo Edison power plant, about a mile upstream, uses approximately 270,000,000 gallons of river water per day. Interview with Mr. J. F. O'Connor, Vice President, Toledo Edison Company.

Although only one refinery is located along the river, all four of the establishments in Toledo use untreated water from this stream. A survey by the writer reveals this industry uses nearly 62,000,000 gallons of such water daily.



Figure 24. Airview of the Principal Waterfront Industrial Area
Along the Lower River East Shore Looking Northeast

With one exception, all of the Toledo manufacturing plants benefiting from economical water transport are located in this segment of the riverfront. The reader will recall that the river channel always has bordered this shore. Front Street, which parallels the river throughout the district, is far enough from the shoreline to allow companies requiring large parcels of land to locate here. Several refineries which are located away from the river have pipe lines to carry their products to marine terminals in this area. The commodities received and shipped are shown in Figure 15.

Toledo's best example of a grouping of complementary industries occurs in the area under consideration (Fig. 24). From the coal, received by water during navigation season, is produced coke, gas, and tar derivatives. Coke goes to the blast furnaces, the gas is stored in a huge tank adjacent to the ovens or is piped to the Toledo Edison's Acme plant, and the tar, until recently, was piped to a nearby industry which makes road surface materials.¹ In addition, the blast furnace slag is used by an adjacent stone company which grinds the material for use as a road metal.

The close assemblage of interrelated industries is economical, but the resulting smoke and offensive odors concentrated here are adverse to residential expansion.² A large rail yard and roundhouse nearby further contribute to this noisome condition. Fortunately, this district is in the northeast part of the city, and thus the prevailing southwesterlies carry much of the noxious air toward the lake and away from the urban area.³

¹The Interlake Iron Corporation now utilizes the coke oven derivatives.

²In East Toledo, 43.60 per cent of the land area, exclusive of streets and alleys, is zoned for heavy industry while 7.28 per cent is used for this purpose. Residents of this portion of the city have cited this condition, together with the fact that only 6.04 per cent is zoned for one and two-family homes, as zoning discrepancies which have retarded home building. Data from MS records of the Toledo and Lucas County Plan Commissions.

³In 1945, the prevailing winds were from a direction between south and northwest on 241 days or two-thirds of the year. Wind from any of these directions will carry atmospheric pollution created in the area under consideration away from the city. Data computed from issues of the "Monthly Meteorological Summary for Toledo, Ohio."

Toledo's Hungarian and Czechoslovakian settlements are adjacent to the industrial area being considered, and many of the wage earners in these groups, especially males, find employment in the nearby industries.¹

The Western Belt.--Toledo's greatest concentration of industry lies along this railway right-of-way. This development started in 1875 when the Milburn Wagon Company, the city's first large manufacturer, located here.² Other large plants to follow were the Toledo Metal Wheel Company, the old Toledo Scale, and the Willys-Overland. About half of the manufacturing establishments having more than 1,000 employees and more than a dozen of the city's best known companies now are situated here. In addition, there is more than a score of smaller plants (Fig. 23). With respect to the major portion of the urban population, this industrial alignment has a most favorable location.

It is interesting and logical that many of the products manufactured in this industrial belt are associated with the automotive industry, for the rail line along which industry has located leads directly to Detroit. Most of the companies were established here before the motor truck became an alternate means of intercity transportation.³ Close attachment to this rail corridor, however, has remained important for the receipt of materials and for the distant shipment of finished products. Among the principal manufactures are: stampings and die castings, spark plugs, transmissions, automotive hardware, machine tools, and finished automobiles.

The rail right-of-way, with abutting industry along most of its length through the city, provides a formidable barrier to traffic and also segregates neighborhoods. As space is at a premium along this industrial ribbon, expansion of plant sites has proven difficult, and it is doubtful if any further development will occur here. However, the situation is different beyond the city limits on the north. Several factories have chosen land ad-

¹See Stephen J. Bartha, "A History of Immigrant Groups in Toledo" (Unpublished Master's thesis, Dept. of History, Ohio State University, 1945), pp. 46, 66.

²See n. 1, p. 29.

³At the time this manufacturing section developed, the area was near the edge of the built-up portion of the city, but the sites chosen were within the city limits (Fig. 6).

jacent to the New York Central and thus the ribbon of industrial development is being extended.

Other localizations of industry within the city.--Besides the major three industrial areas within the city, there are four widely separated smaller agglomerations. Railroads intersect all four of these developments.

One site for a series of plants is along the main line New York Central right-of-way from the southeast corner of the city to the vicinity of the Maumee River crossing (Fig. 23). The main lines of four other railroads also focus on this area and provide interconnections to make the location one of the best served in the city.

On the west side of the river, two of the three clusters are near the Michigan Central Railroad (Fig. 23). In recent years, the central portion of this crosstown line has been removed so that the two segments now are served from interconnections with other rail facilities at each end. In the vicinity of the intersection of this dismembered line with the Wabash and Nickel Plate railroads is the only industrial area of note in the southern portion of Toledo.

The remaining area of manufacturing concentration is along the west shore of the lower river, opposite the earlier mentioned Birmingham-Ironville riverfront development. Plant sites here are near the river, but none of the activities, except the Shell petroleum marine terminal, utilize the waterway. From the long-established Woolson Spice Company come the odors of various ground spices which linger heavily over the surrounding district. The Pennsylvania Railroad, which borders the river for several miles in this section of the city, provides a rail outlet for most of the companies.

Expansion into the Fringe Area

In recent years, industries locating or relocating in the Toledo area frequently have chosen sites beyond the limits of the municipality. The 29-mile Toledo Terminal Railroad, which follows the city limits quite closely, has encouraged this development. Adjacent to this rail belt line is a 69,000 volt double circuit power line which insures industries locating in the border of the city of adequate power at all times.

Frequently cited factors for industries seeking outlying

industrial locations are the lower taxes and cheaper land.¹ The factor of larger tracts of cheap land, which allows the building of economical one-story plants with additional land for expansion and parking facilities, is more fundamental. Here the factory is not crammed into a street pattern which was designed for residential or commercial use.

Factories erected in the last decade in the Toledo area, as in other cities, have arisen principally at the edge of the built-up area. When such building is beyond the limits of the city, it has two marked effects upon the community. The immediate result is added fiscal problems, such as the lost taxes and the expense of extending public facilities. Lack of zoning beyond the corporate limits allows haphazard choice of locations with resulting ill effects. The trends in this development will affect the growth of future residential areas. Fortunately, little industrial development has taken place on the western or windward border of the city.

The Northern Industrial Fringe.---Beyond the northern boundary of Toledo is the principal area of recent industrial building (Figs. 1 and 23). Near this border are a dozen plants employing more than 100 persons. Ten of this group are outside the city, and six have been erected since 1938.

Land in the northern fringe, as elsewhere throughout the Toledo area, is essentially flat, and thus there has been no topographic factor to encourage localization. The resultant has been a wide dispersal of plant sites. Although all of the major companies referred to above are adjacent to rail facilities, several make little use of this service. However, close proximity to the principal highways leading to Detroit (U. S. 24 and 25) is advantageous for eight of the twelve companies, as their chief markets lie in the vicinity of that city. The Ottawa River passes through part of the northern borderland, but its only use is for carrying away industrial wastes.

Toledo's two principal war-born establishments, the American Propeller and Packard Motor plants, located in this northern peripheral area of the city.² Large blocks of land were required

¹A one per cent city payroll tax implemented in 1946 may prove an additional factor for companies choosing the periphery of the city.

²Since the war, the Martin-Parry Corporation of Detroit

for both projects. Considerable building of modest residential structures in the vicinity followed these companies, both of which were manufacturers of aeronautical products.

Property taxation rates in Washington Township were 17.0 mills in 1946. As this was only two mills below the Toledo rate, it appears that this factor would not weigh too heavily in choosing the suburban zone. More important were the large tracts of available lower-valued land without the urban transportation congestion. It might be well to set up an industrial district in a portion of this northern fringe area. If this zone of industry is incorporated into the city at some future date, a question arises as to whether the entire township should not be included for this unit is heavily dependent upon these industries for financial support of its various activities.

Other peripheral industrial localizations.--In addition to the broad zone of industrial development north of Toledo, there are three other areas significant of mention. Each one lies on a different border of the city.

The most important of the areas from the standpoint of present and future development is that in the vicinity of the east shore of Maumee Bay. This is a continuation of the previously mentioned major industrial district along the east shore of the lower river. At present, two large petroleum refineries (Standard and Pure) are established here (Fig. 26). The reader will recall that the huge yards for the Chesapeake and Ohio coal dock and the future yards and docks of the New York Central and Baltimore and Ohio railroads also are in this East Bay Shore district. In the surveys of Toledo made by Bartholomew (1924) and Griffenhagen (1928), this area was suggested for development as an industrial harbor.¹ Such a leeward location with respect to the urban area is desirable especially for heavy industries. The Oregon Township tax rate of 10.0 mills in 1946 offers a particularly favorable advantage for industrial development, as this figure is little more than half that paid within the city.

South of Toledo and east of the Maumee River are several centers of activity which, though widely varied, can, as a group,

has acquired the major portion of the American Propeller Corporation plant.

¹For a reference to these studies see n. 1, p. 82.

be classified best as industrial. Adjacent to the city, in Wood County, lies the satellite glass-making community of Rossford.¹ The forerunner of the Libbey-Owens-Ford Glass Company was the founder of this town, and the present company strongly dominates the local industrial picture. There are several other sizable establishments, however, and, in addition, the large railroad yard of the Baltimore and Ohio. About 4 miles to the southeast of Rossford, in the vicinity of Walbridge, is the suburban center of Toledo's railway repair and yard development (Fig. 1). The Chesapeake and Ohio, Pennsylvania, and New York Central utilize large tracts of land here. Between the two forementioned towns is the huge Rossford Ordnance Depot (Fig. 1). This storage center for Army equipment employed over 1,000 persons in the spring of 1946.

The final peripheral industrial cluster is west of the city in the vicinity of Dorr Street and the New York Central (Figs. 1 and 23). Although the plants in this area are beyond the city limits, all are located inside of the Toledo Terminal belt line. These companies lie in an enclave that probably will become a part of Toledo before many years have passed.

Section 4. Major Groups of Industries

The 500-odd manufacturing enterprises of Toledo and its immediate environs show a wide variation in products. Some have brought the city recognition as a result of their individuality and important rôle in the national market, whereas, others have only local or regional significance.

In the national market, products with widely known trade names are principally responsible for Toledo's acclaim as an industrial center. Champion spark plugs, Libbey glassware, Willys automobiles, DeVilbiss atomizers, Toledo scales, and Libbey-Owens-Ford safety glass are good examples. Some of the other manufactures for the national market receive less recognition, as the goods and trade names are not prominently displayed before the public. Many of these products, however, are well known to the various trades. Among the many materials included in this group are spray painting equipment, heating units, oil well supplies, elevators, special machine tools, dental supplies, and canvas

¹In 1940, the population of this town was 3,912.

goods and work gloves.¹ In addition, some articles which have a national distribution and commonly are considered as products of Toledo actually are the products of branch plants of companies having main offices, research laboratories, and manufacturing of other goods in the city. Outstanding among this group are such articles as Owens-Corning Fiberglas, Auto-Lite spark plugs and batteries, and Owens-Illinois "Duraglas" containers and structural glass blocks.

Turning to the more numerous industries, which are common to all or many urban centers and which supply the local and regional markets, again we find manufactures of consumer and non-consumer goods. Food and beverage processors and job printers alone account for more than 20 per cent of Toledo's manufacturing establishments.² Such special lines of non-consumer goods as automotive electrical equipment, upholstery, die castings, and axles and transmissions have the nearby Detroit area as their principal market, although they have nationwide distribution after assemblage. Petroleum refineries and milling companies chiefly serve the local and regional markets. An exception to the latter group is the National Milling Company, which supplies flour to all of the National Biscuit bakeries in the eastern United States.³

According to the Census publication Manufactures, 1939, 456 of the community's enterprises were grouped within the city. In addition, forty-three concerns were outside of the city in Lucas County. The portion of Wood County adjacent to Toledo accounts for about a dozen additional manufacturing establishments.

¹In 1939, the 1,220 persons employed in the Toledo Industrial Area for the manufacture of canvas goods and work gloves represented 49 per cent of those similarly engaged in Ohio, and 7.8 per cent of the total thus employed in the United States (Sixteenth Census of the United States: 1940. Manufactures, 1939, Vol. III, passim).

²Ibid., p. 798.

³This mill is reputed to be the largest soft wheat mill in the world, producing an average of about 9,500 barrels of flour daily. Of approximately 12,000,000 bushels of wheat milled here yearly, about 9,000,000 bushels come from Ohio, Michigan, and Indiana and 2,000,000 bushels come from Kansas. The remaining 1,000,000 bushels are spring wheat. Interview with Mr. P. A. Kier, Manager, National Milling Company, Toledo.

A goodly portion of the soft winter wheat belt and all of the hard wheat production lie west of Toledo. Grain from these areas can come to Toledo for milling and continue on to the East at in-transit rates.

Automotive Industry

Toledo was an important automobile center almost as early as Detroit, but the city's development in this industry has been along somewhat different lines. To be sure, materials produced by Toledo's automotive industries have been principally used by the various assemblers in this field of activity. In recent years, however, the variety of products have increased to include a sizable and expanding market which is not dependent upon the internal combustion engine. The automotive parts companies have been particularly active in broadening the bases upon which their operations rest. This has aided Toledo--the second city of the Central Automobile District (Fig. 25A) in population--in developing more of a diversity of interests than any other community in the area.¹

Direct employment in the automotive industry of the Toledo Industrial Area amounted to 10,120 persons in 1939.² This figure, which accounted for 26.6 per cent of the total in manufacturing establishments at that time, is divided into three major categories: (1) motor vehicles, bodies, parts, and accessories; (2) automotive electrical equipment; and (3) automobile stampings. The first two groups each claim an eighth of the employees in manufacturing. The relative importance of these automotive activities changes, however, when compared with state and national employment in the respective industries. Only in the automotive electrical equipment industry is Toledo outstanding, accounting for 86.5 per cent of the total thus engaged in Ohio and 22 per cent of the total for the nation.

The important place which Toledo was to hold in automo-

¹Cf. H. H. McCarty, The Geographic Basis of American Economic Life (New York: Harper & Brothers, 1940), pp. 646-50.

Toledo ranked fifth among the metropolitan districts and seventh among individual cities in the number employed in manufacturing automobiles and equipment in 1940.

Delimitation of the area and the term "Central Automobile District" follows the use by Charles C. Colby and Alice Foster in Economic Geography (Boston: Ginn and Co., 1940), pp. 348-55.

²Sixteenth Census of the United States: 1940. Manufactures, 1939, Vol. III, p. 798. In 1940, the automobile and automobile equipment industry included 10,438 persons or 23.5 per cent of the total for Ohio (Sixteenth Census of the United States: 1940. Population, Vol. II, Part V, pp. 563, 595).

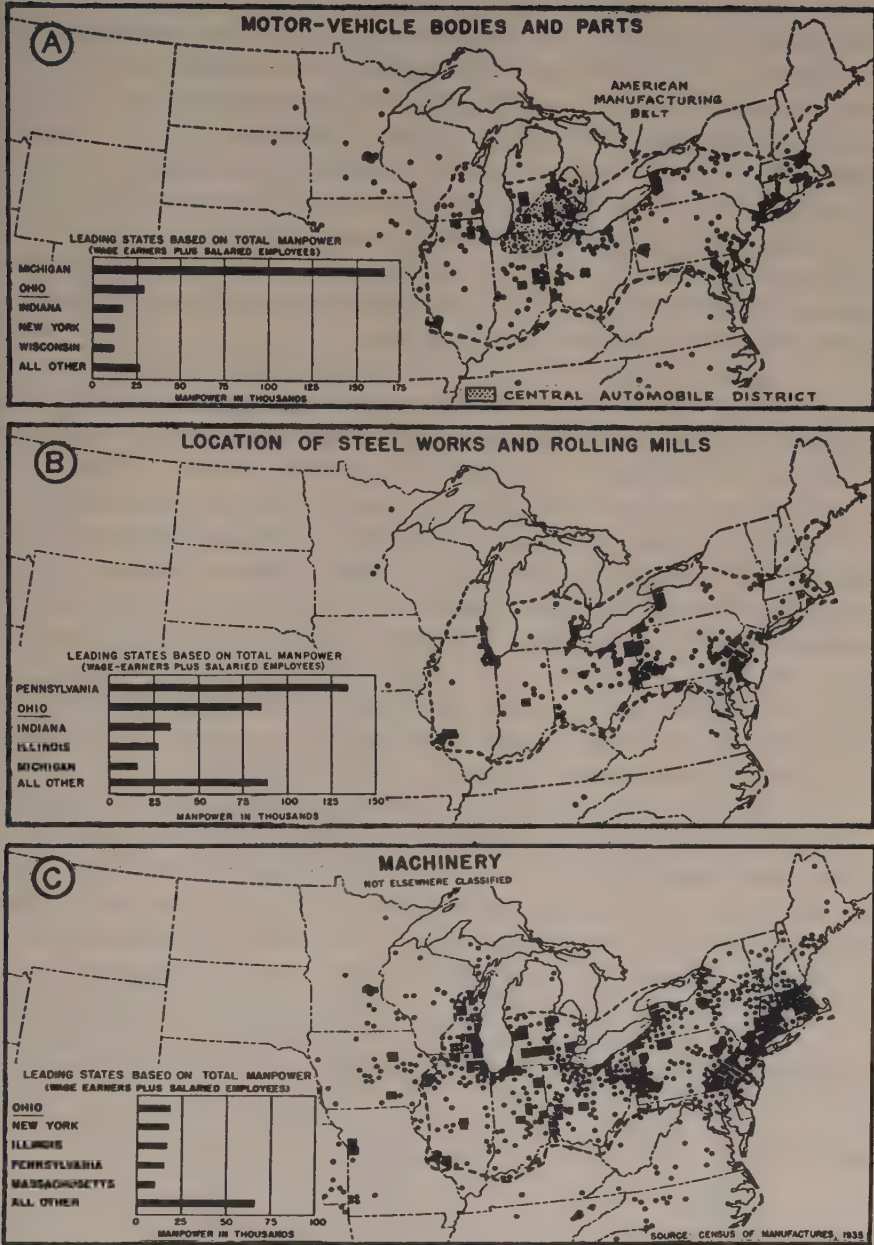


Figure 25. Distribution of Automotive, Steel, and Machinery Industries in Northeastern United States

bile manufacture was disclosed practically at the outset of the industry. The city's well-established and important carriage, metal wheel, malleable iron, and machine tool industries provided much assistance for the building of such pioneer autos as the Pope-Toledo, Milburn Electric, and Ohio Electric.¹ None of these early cars were to succeed, but in 1909 John Willys moved the Overland Company from Indianapolis to the site formerly occupied by the Pope Motor Company. Through the years, Willys-Overland has remained the only Toledo plant making finished motor cars and trucks. As this firm expanded, employment in the city came to fluctuate with the fortunes of the organization.²

Many companies which supplied the Willys enterprise with parts or services were encouraged to establish themselves in Toledo. Later, as they gained momentum, their expanded production led them into the Detroit market.

Among the Willys-induced industries are (1) Warner Manufacturing Company (now Chevrolet-Toledo), established in 1909 upon moving from Muncie, Indiana; (2) Champion Spark Plug Company, established in 1910 upon moving from Boston; (3) City Auto Stamping Company, established in 1914 upon moving from Dayton; (4) Mather Spring Company, organized in 1911; (5) Electric Auto-Lite Company, established in 1911; (6) Tillotson Carburetor Company, established in 1914; and (7) Mountain Varnish and Color Works (now E. I. du Pont de Nemours) started in 1920.

It has been said that "it took the greater part of the auto industry to refashion Detroit, whereas, the development of Toledo was almost a one-man job."³ This statement bears much truth up to the 1930's, as the Willys-Overland, at its peak, alone accounted for more than 30 per cent of the city's industrial employment.⁴ Willys was among the first to feel the effects of the

¹The Pope Motor Company first appeared in the 1904 issue of Polk's Toledo City Directory. No better reference as to the date of this company's origin could be found by the writer.

²In 1915, Willys sold more automobiles than any other manufacturer except Ford (Kennedy, op. cit., p. 68).

³Ibid., p. 67.

⁴Cf. "How One City's Industry Is Helping America," Factory Management and Maintenance (August, 1940), F4.

depression, and in 1933 the company went into receivership.¹ Although the firm was reorganized, employment continued to be low through the remainder of the decade. During the recent world conflict, the figure stood at about 20 per cent, and at the time of writing, Willys employs approximately 10 per cent of the total engaged in manufacturing in the community. The worldwide publicity given the "Jeep" during the war, plus the introduction of a varied line of other motor cars makes it likely that the Willys-Overland will maintain an important rôle in Toledo's industrial economy.² It is improbable, however, that this company ever will approach the industrial preëminence which it formerly held in the community.³

Several of the previously mentioned Willys-prompted industries, especially Electric Auto-Lite and Champion Spark Plug, have grown to become world leaders in their respective fields. Industries such as the Spicer Manufacturing Company, Doehler Die Casting Company, and Dura Company also are outstanding in the production of transmissions, die castings, and automotive hardware respectively. Still other plants produce bumpers, fenders, springs, carburetors, piston rings, and many additional parts for the automobile industry.

Figure 25 shows Toledo's position with respect to the production of automobiles and their parts and to several other closely related activities. It is highly significant that the three states which contain portions of the Central Automobile District held 76 per cent of the nation's direct automotive employment in 1939.⁴ Residing in the nearby Detroit area alone are almost half (45.9 per cent) of the country's auto workers.⁵ More-

¹One writer has remarked that "Willys earnings, whether good or bad, always seemed like an exaggeration of current tendencies," (Kennedy, op. cit., p. 167).

²For the story of Willys-Overland from the "depression thirties" to 1946 see "Willys-Overland," Fortune, XXXIV (August, 1946), 80 ff.

³The writer has found a general awareness and recollection among Toledoans of the hazards of single-company dominance.

⁴This computation is based on the three categories of automotive employment previously considered.

⁵Detroit City Plan Commission, op. cit., p. 5.

Only three producers of complete passenger cars--Stude-

over, the great purchasing area for motor vehicles closely resembles the distribution of population, 50 per cent of which is north of the Ohio and Potomac rivers and east of the Mississippi.¹ Although Toledo holds a most favorable location with respect to all the distributions mentioned, this fortunate situation also is shared by a number of other cities. Thus, it has been such additional features as early momentum and superior transportation facilities which have carried Toledo forward in the automotive industry as well as in other fields of manufacturing yet to be considered.

Toledo's position near the center of the Central Automobile District has strongly encouraged the city to partake in many phases of the automotive industry. In fact, the Census figures have shown that more than a quarter of all manufacturing employees thus were engaged in 1939. It appears likely that the center of the country's automotive production will remain near Toledo, and that a considerable portion of the community's industrial function will continue to follow the trends of this industry. Among the reasons for this conclusion are (1) the automobile companies and the producers of parts and equipment are mutually dependent upon one another, and this provides a deterrent to the dispersion of the industry; (2) the ubiquitous unionism in the automotive industry nullifies any reason for moving to obtain cheaper labor; (3) the availability of skilled and semi-skilled labor; and (4) the central position with respect to assembling raw materials and distributing the goods produced.

Metals and Machinery Industry

The manufacture of metal products and machinery is among Toledo's oldest industrial enterprises and by 1940, as a group, it accounted for more manpower than any other industrial function. For the Toledo Industrial Area, this amounted to 31 per cent (13,128) of the total. In this group are industries producing iron, steel, and non-ferrous metals and their products, including machinery of all kinds. Such all-metal automobile parts as fend-

baker, Nash, and Willys--are located outside of the Detroit area (Ibid., p. 12).

¹See U. S. National Resources Planning Board, Industrial Location and National Resources, p. 12.

ers, springs, and bumpers have the physical characteristic of the group under consideration, but they are not treated here due to inclusion in the automotive industry.

Toledo hardly could be other than an important producer of metal products including machinery with the close proximity to iron and steel plants on the one hand and to markets on the other (Fig. 25B). About 59 miles due south of Toledo, at Dola, Ohio is the geographic center of the nation's steel industry.¹ Approximately the same number of miles to the north is Detroit, center of the automotive industry and a market for innumerable metal products. This latter area is a steel producer, but the output is used principally within the locality. Thus, Toledo relies largely upon the eastern Ohio plants. Direct rail and truck routes connect these points with the city. Cleveland, the Chicago-South Bend area, and southwestern Ohio are other important markets for the finished products of Toledo's metal and machinery industry.

The output of iron and steel in Toledo does not justify the city's excellent position for this production. Although located at the most direct rail-water junction point for Middle Appalachian coal and Lake Superior iron ore, there is but one iron producer in the area.² The basic reason for this condition appears to be the development of this industry at a time when the major source of coking coal was from the northern Appalachian fields.

The sole basic iron industry in the Toledo area is the Interlake Iron Corporation which has two riverfront furnaces with a combined capacity of about 1,300 tons of pig iron per day (Fig. 24). To produce this quantity requires about 1,800 tons of coal, 2,600 tons of iron ore, and 650 tons of lime.³ Unlike the inte-

¹American Iron and Steel Institute, Steel Facts (June, 1945), p. 2. Although no steel is produced at this point, it is significant as the "center of gravity" for the production of steel by the "tons-times-miles" method of calculation.

²The change from producing coke principally by the beehive method to the use of the retort method encouraged the shift of the iron industry toward the large centers of population where by-products could be sold. In 1918, 46 per cent was produced by the retort method, and by 1939 this had increased to 97 per cent. See U. S. Bureau of Mines, Minerals Yearbook: 1940 (Washington: Government Printing Office, 1940), p. 880.

³Interview with Mr. J. H. McDaniel, Superintendent, Interlake Iron Corporation, Toledo.

grated iron and steel companies, this merchant furnace varies the quality of its product to the specific needs of the buyer.¹ Some of the output is sold to local foundries and casting companies, but the principal markets are beyond the Toledo area, especially in the Detroit-Pontiac district and in Indiana and southern Ohio.

No steel plant or rolling mill is located in the Toledo area, although the city is ideally situated for such development. Adequate production in established plants hinders expansion to new sites. Nevertheless, several local companies produce carbon and alloy steels for their castings by the use of electric furnaces.

The fabricators of metal products provide Toledo with its principal claim to industrial diversity. Most numerous are the foundries, casting companies, pattern shops, general machine and machine tool companies (Fig. 25C), and metal stamping companies which fashion materials largely for the producer market. Nearly all of these organizations have served the automobile industry, but other fields of industry provide added stability. More widely known are the companies which turn out finished products made entirely or largely of metal. The variety of items produced by this group includes electric roasters, vacuum cleaners, floor surfacing machines, furnaces, oil well supplies, spray equipment, elevators, scales, safes, dental instruments, railroad brake shoes and car wheels, and ships.

As a large majority of the laborers required in the previously mentioned industries are skilled and as the principal markets for the products are nearby or are served directly by rail and/or truck lines, it appears certain that the metal in-

Ore and coal are received by water during the navigation season, while railroads bring the limestone from Bellevue, Ohio and the coal during the winter. See p. 98 for an explanation of the receipt of coal via Lake Erie.

¹Such by-products as coke-oven gas, "domestic" coke, and tar derivatives provide additional revenue for the company.

Pipe lines now deliver natural gas from the Mid-Continent fields to Toledo at prices which make difficult the sale of manufactured gas having a lower heat value. For an excellent survey of the economics of pig iron production see William A. Haven, "The Manufacture of Pig Iron in America," Blast Furnace and Steel Plant, XXVIII (April and May, 1940).

dustries of Toledo will continue to prosper.¹ The introduction of new light metals should have no adverse effect upon the function of this industrial group, but on the contrary they may provide a means for further growth.

Glass Manufacture

Toledo's important function in the glass industry has brought it the title of "Glass Capital of America" and "Glass Center of the World." Such illustrious phrases rightfully are deserved, although in terms of actual production the word "capital" perhaps is better chosen than is "center," for although four of the country's leaders in the glass industry have their executive offices and research laboratories in Toledo, two of the group have all of their production elsewhere.

The glass plants of Toledo and adjacent Rossford utilized about 5 per cent of the persons engaged in manufacturing the country's basic glass products in 1939.² Although the national total in this activity places it as a minor industry, in 1946 employment in the glass industry of the Toledo area represented roughly 10 per cent of all industrial workers. In no other major American city is the relative importance of glass as great. This is true despite the primary glass-producing district being some 200 miles to the southeast in the upper Ohio River Valley "Gas Belt." Largely responsible for Toledo maintaining her high position as a glass center has been the rapid growth and first-rank importance of laminated (safety) glass.³ This material is associated closely with the automotive industry and, with the exception of Ford, Toledo produces all of the laminated glass made in the Central Automobile Belt.

¹Cf. Richard Hartsborne, "The Economic Geography of Plant Location," Industrial Property, Vol. VI of the Annals of Real Estate Practice: 1926 (Chicago: National Association of Real Estate Boards, 1926), pp. 40-76.

²There were 79,315 persons employed in the manufacture of flat glass, containers, and glassware in the United States at that time (Sixteenth Census of the United States: 1940. Manufactures, 1939, Vol. III, pp. 28, 38).

³Michigan and Ohio had the principal inward shifts of wage jobs in the glass industry between 1929 and 1937. See U. S. National Resources Planning Board, Industrial Location and National Resources, p. 101.

Products of the four Toledo glass organizations cover the three major markets for glass namely, the container, the construction, and the household fields. The companies and principal products manufactured by each are Owens-Illinois Glass Company, glass containers and structural glass blocks; Owens-Corning Fiberglass Corporation, fibrous glass; Libbey-Owens-Ford Glass Company, flat glass; and Libbey Glass (now a division of Owens-Illinois), glass tableware. The latter two companies account for the glass workers employed in the Toledo area.

The manufacture of glass probably is the most commonly cited case of an industry attracted to fuel--natural gas.¹ This most nearly ideal of all fuels for glass making, due to cleanliness and high, uniform temperatures, became available in northwestern Ohio in 1884 when gas wells were opened. By the end of the century, this supply largely was exhausted and many glass factories in the smaller communities south of Toledo moved to new sources of fuel.² Toledo, however, retained her glass industry, though natural gas had to be piped from increasingly distant fields.³

In 1888, Toledo gained its first major present-day industry when Edward D. Libbey brought his organization, the New England Glass Company, from East Cambridge, Massachusetts.⁴ In 1892, the business became known as the Libbey Glass Company. Shortly after coming to Toledo, Libbey obtained the services of Michael J. Owens, a master glass blower from Wheeling, West Virginia. This associ-

¹A survey of fifty glass plants showed twenty-three indicating fuel as the most important factor for locating their industries. See Lezius, "Geography of Glass Manufacture at Toledo, Ohio," op. cit., p. 403.

The above reference, together with "Toledo--Glass Center of the World," Ohio Architect, V (June, 1944), are the best accounts of the development of the glass industry in Toledo.

²During the decade of the nineties, glass manufacturing decreased 19 per cent in Ohio (Lindley et al., op. cit., p. 177).

³In a recent year, the glass and ceramics industry of the Toledo area used an estimated 43 per cent of the total gas used by all industries. From files of the Ohio Fuel Gas Company (See n. 1, p. 105).

⁴High cost of coal and labor difficulties in Massachusetts on the one hand and cheap fuel in northwestern Ohio on the other influenced Mr. Libbey to move to Toledo.

Around the original building has developed today's extensive factory layout.

ation was to result in Toledo becoming a pioneer in more major developments in the quantity manufacture of glass products than any other city.¹ Owens' contributions to the mechanical production of blown glass articles and flat glass had the financial support of Libbey. That these two men were jointly and separately manufacturers of glass products has resulted in the interplay of their names in all of Toledo's glass industries and is largely responsible for the city's continued prominence as a glass center.

The third of Toledo's noted glassmakers, Edward Ford (whose father had established the first commercially successful plate glass factory in America) purchased a 173-acre farm adjoining the southeast limits of the city in 1899. Here he erected a plate glass plant and established the town of Rossford (Fig. 23).²

Ford chose the site near Toledo primarily because of inexpensive land along the bank of the Maumee River. This provided the large supply of water essential to the operation of a plate glass plant. It is estimated that the Rossford plant uses about 25,000,000 gallons of water from the river daily.³ Another important advantage of this location is a river frontage of approximately 1 mile where, in shallow water beyond the navigable channel, waste materials can be deposited with the result of adding more land to the company's property.⁴ In addition, much of the sand used for grinding purposes is received by lake vessel at the Baltimore and Ohio dock, occupying the adjacent riparian frontage downstream. It is claimed that the Rossford plant, which has a

¹Mr. Libbey probably was the greatest individual figure in modern American glass production, and Mr. Owens has been considered the greatest inventive genius the glass industry ever has known. See J. G. Glover and W. B. Cornell, The Development of American Industries (New York: Prentice-Hall, Inc., 1941), pp. 473-74. The chapter on "The Glass Industry" was prepared by the American Glass Review.

²"Toledo--Glass Center of the World," op. cit., p. 3.

³Letter from Mr. G. W. Curtiss, Economist, Libbey-Owens-Ford Glass Company. September 11, 1944.

⁴It is interesting to note that the Rossford plant has made little use of natural gas. From 1899 until 1931, it was dependent upon gas made from coal and, since that time, it has used chiefly refinery gas provided by the Pure Oil Company (Ibid.).

one-floor layout, is the world's largest plate glass factory under one roof. Another plant, formerly the Libbey-Owens Glass Company, straddles the Toledo corporate limits about 2 miles to the east and on the main line of the New York Central (Fig. 23). Few of the advantages accruing at the riverfront site are to be found there.

The duplication of family names in Toledo's glass organizations makes it difficult to follow the industry's development. However, briefly, the present companies evolved in the following manner:

1. Libbey-Owens-Ford Glass Company (1930) was created from a merger of Libbey-Owens Glass Company and Edward Ford Plate Glass Company.
2. Owens-Illinois Glass Company (1929) was created from a merger of Owens Bottle Company (formerly Owens Bottle Machine Company) and Illinois Glass Company.
3. Libbey Glass Company (1888) became a division of Owens-Illinois Glass Company in 1935.
4. Owens-Corning Fiberglas Corporation (1938) is owned jointly by Owens-Illinois Glass Company and the Corning Glass Works.

Although the above companies have but three glass plant sites in the Toledo area, they are collectively the control center for twenty-five other points of manufacture located in such widely distributed places as Oakland, California; Waco, Texas; Shreveport, Louisiana; and Ashton, Rhode Island.¹

The glass companies are one of Toledo's principal users of raw materials.² Three principal ingredients needed are silica sand, soda ash, and lime. Though sandstone from the Silica, Ohio quarries first was used by the Toledo companies, impurities made this source unsatisfactory shortly after the turn of the century. Today, the silica sand is obtained from the Ottawa-Wedron dis-

¹Data on the organization of the various glass companies were obtained from the companies' annual reports for 1945.

The Owens-Illinois and Libbey-Owens-Ford Glass companies jointly own or lease 588 gas wells in West Virginia (Owens-Illinois Glass Company: Annual Report, 1945 [Toledo: Owens-Illinois Glass Company, 1946], p. 10).

²For a detailed account of the materials used in the glass industry see Lezius, "Geography of Glass Manufacture in Toledo," op. cit., pp. 406-09 and S. R. Scholes, Modern Glass Practice (Chicago: Industrial Publications, Inc., 1941).

trict of Illinois.¹ The other two major commodities--soda ash and limestone--are secured principally from nearby southeastern Michigan and northwestern Ohio respectively.

Among the glass producing centers of the country, the Toledo area ranks foremost in employment. In April, 1940, the number engaged in the manufacturing phase of this activity totaled 4,647 persons. By March, 1944, the figure stood at 5,048 and by March, 1946, the number had reached 5,649.² Little female labor is required at the Libbey-Owens-Ford plants due to the heavy nature of the operations in producing flat glass. At the Libbey plant, where fine glass tableware is the major product, women are used chiefly for inspecting, decorating, and packaging. The amount of skilled labor needed in the glass industry has been reduced greatly with the perfection of machine production.³

Continued prominence in the glass industry appears to be assured for Toledo, both from the standpoint of production and administration. The primary goods produced by Libbey-Owens-Ford are plate glass, safety glass, and thermopane. Transportation costs are important for these bulky items, and Toledo is located excellently with respect to the market for such products, especially safety glass for automobiles.⁴ The use of glass in new

¹This commodity is brought to Toledo entirely by rail. Libbey-Owens-Ford utilizes from ten to twenty cars per week. Letter from Mr. G. W. Curtiss, op. cit.

²Data secured from MS records of the Industrial Commission of Ohio. The figures are the combined employment of the Libbey-Owens-Ford and Libbey factories. There were over 1,400 additional workers in downtown offices of the several glass companies in March, 1946.

Pittsburgh had only 912 persons in the glass and glass products industry in 1940. Employment in the stone, clay, and glass industries of Allegheny County was 5,844 (Sixteenth Census of the United States: 1940. Population, Vol. II, Part VI, p. 56, and Vol. III, Part V, pp. 125-26).

³The number of glass blowers is hardly 5 per cent of the total employed about 1900, but the production of hollow glass is more than twenty times as great. See A. Watts, "The Glass Industry in Ohio," Ohio Engineering Experiment Station News, XI (October, 1939), 10-13.

⁴Libbey-Owens-Ford and Pittsburgh Plate Glass together make about 85 per cent of the safety glass and 93 per cent of the plate glass manufactured in the United States. Cf. Kennedy, op. cit., p. 284.

Libbey-Owens-Ford is the principal supplier of glass to the automotive industry and supplies all of the glass require-

forms for building construction is increasing. Architectural glass for particular needs is facing a future of expansion.

At Libbey Glass, articles produced range from fine hand-blown crystalware and machine-made glassware to television tubes and glass insulators. The wide recognition of the quality of this organization's products and the fact that its entire production is in Toledo points to a stable future.

Although Toledo lost the bottle-making portion of the industry through licensing of Owens' machine to numerous container manufacturers, a number of these companies since have been acquired by Owens-Illinois.¹ This company also has an important place in the construction field through its production of structural glass blocks and part ownership in the corporation which produces fibrous glass for insulation and a score of other uses.

The two master glass companies, Libbey-Owens-Ford and Owens-Illinois, have added further diversity to their broad range of products by developing several subsidiary industries in Toledo. Largest is the Plaskon division of Libbey-Owens-Ford. This plastics industry, with two plants in Toledo, is said to be the world's largest producer of urea-plastics. The Owens Brush Company, makers of toothbrushes, hairbrushes, et cetera, is a subsidiary of the Owens-Illinois Glass Company. Another local branch of this latter company is the Closure Division, which makes metal and plastic tops for glass containers.

The momentum and prominence of Toledo as a glass center act as a centripetal force attracting companies making ancillary products such as heat-treating furnaces, refractories, moulds, special machinery, and mirrors. They find profit in being associated with the dominant industries.

Petroleum Refineries

Toledo holds an important place among the petroleum re-

ments of the General Motors Corporation (Twenty-Ninth Annual Report of Libbey-Owens-Ford Glass Company, 1945 [Toledo: Libbey-Owens-Ford Glass Company, 1946], p. 4).

¹Owens-Illinois furnishes about 40 per cent of the bottles used in the United States. For accounts of the development of Owens-Illinois Glass Company see "Billions of Bottles," Fortune, V (April, 1932), 70 ff. and "Owens Again, and Why," Fortune, XIII (May, 1936), 113 ff.

fining centers of the American Manufacturing Belt. In this portion of the United States, only the East Chicago-Whiting area and the Marcus Hook-Philadelphia area have larger cracking capacities. The entire supply of crude petroleum reaches the city's four large refineries by pipe line, chiefly from the Mid-Continental and Illinois fields (Fig. 17). The refined products are distributed by tank truck, tank car, pipe line, and lake vessel.

In 1885, the first oil well of importance in Ohio was opened in the Lima field at Findlay, 45 miles south of Toledo. Development of this field was rapid, and by 1889 the Paragon Refining Company (now Gulf Oil Corporation) was established in Toledo.¹ As the search for oil was extended, small deposits were found as far north as Toledo.² In 1890, the Sun Oil Company was established along the east city limits.³ Though production in the Lima field began to decline after 1896, Toledo's refineries did not follow a similar pattern.⁴ This nearby field not only provided the impetus for starting refineries, but it also prompted the development of the important oil well equipment industry now in Toledo.

By the time that the Standard and Pure Oil companies had established their plants beyond the northeast limits of the city in 1920 and 1931 respectively, the output of petroleum in northwestern Ohio had been reduced greatly. However, the availability of petroleum from distant sources by the extension of pipe lines

¹Geological Survey of Ohio, First Annual Report, op. cit., p. 201.

²Numerous oil wells are shown at the present sites of the Standard Oil and Pure Oil refineries on an early topographic map. See U. S. Geological Survey, Maumee Bay Quadrangle, Ohio-Michigan (Washington: Geological Survey, 1900). In 1891, oil was discovered in Oregon Township, Lucas County (Oil and Gas Journal, XXXIII [August 23, 1934], 98). This issue provides a good reference for important dates in the development of America's petroleum industry.

The Klondike oil well, which geysered up in a field on Millard Avenue, brought a great flurry of drilling in the Ironville District of East Toledo. See Ohio Writers' Project, The Ohio Guide (New York: Oxford University Press, 1940), p. 330.

³Killits, op. cit., p. 431.

⁴From 1895 to 1902 inclusive, more petroleum was produced in Ohio than in any other state (Ohio Development and Publicity Commission, Ohio--An Empire Within An Empire [Columbus: Heer Printing Co., 1944], p. 108).

and the excellent location of Toledo for distributing petroleum products by land and water encouraged expansion of the refinery industry here.¹ Today, numerous storage tanks of the forementioned organizations, together with those of the large Sinclair terminal, dot the landscape in many parts of the East Side (Fig. 1).

In 1939, the value of products from the four petroleum refineries in Toledo placed this activity in first place among all industries. The total value was over \$32,000,000 or 40 per cent of the total for this industry in Ohio.² The value added by manufacture, however, was less than \$4,000,000.

The fact that the value added by manufacture is less than 13 per cent of the total value of production suggests that the products are not altered markedly by an intensive utilization of manpower. This is substantiated by the relatively low employment in the refinery industry. In 1939, the total employed in manufacturing was 1,135.³ Employment for the four Toledo refineries at later dates shows the following steady increase: April, 1940--1,322; March, 1944--1,698; and March, 1946--1,950.⁴

All of Toledo's petroleum refineries are located east of the river, but only one is wholly within the city (Fig. 26). Although this company--Gulf Refining--has the sole waterfront site, all companies have terminals for lake shipments and all use large quantities of surface water from the river and bay. As the petroleum products and the water can be piped, no significant disadvantage results from an inland location. Furthermore, the low tax rate in the township bordering the east limits of the city provides an inducement for industry to choose this fringe area. The relatively small employment required by the refineries allows location here without penalty to a large labor force.

The capacities of the Toledo refineries are shown in

¹It was about 1930 that Toledo began to develop her lake shipment of petroleum products. Today the volume ranks second only to coal (see chap. 11, sec. 4). The pipe line transportation of petroleum products also began about 1930 (Locklin, op. cit., p. 691).

²Sixteenth Census of the United States: 1940. Manufactures, 1939, III, pp. 777, 799.

³Ibid., p. 798.

⁴Data secured from MS records of the Industrial Commission of Ohio.



Figure 26. Airview of Toledo Petroleum Refineries

Table 18. These totals place the community's production capacity at slightly more than half of that for the entire state. All of the companies produce gasoline, kerosene, distillate and residual fuel oils. Other products, in which one or more of the refineries share, include petroleum coke, lubricating oils, and refinery gas. In addition, the Sun Oil Company has a synthetic rubber plant with a capacity for producing 15,000 short tons of butadiene per year.

TABLE 18

TOLEDO REFINERIES AND THEIR DAILY CAPACITIES, 1946*

Company	Crude Oil Capacity (bbls.)	Cracking Capacity (bbls.)
Gulf Refining	23,000	10,000
Pure Oil	29,400	61,100
Standard Oil	20,000	7,200
Sun Oil	35,000	31,000
Total	107,400	109,300

*Source: The Oil and Gas Journal, XLI (March 30, 1946), 260.

Toledo's refinery industry, like the glass industry, has continued to expand since the war. An enviable location with respect to dense auto population and lake tanker distribution and a position with few competing refineries (Fig. 17) appears to assure the city's future as an important center for petroleum refining.

APPENDIX I

LAND USE AND ZONING IN TOLEDO, OHIO*

Note: The land and water areas of Toledo amount to 37.45 square miles and 4.17 square miles respectively. Of the land area, 76.58 per cent or about 28.69 square miles are in use or are useable. The remaining 23.42 per cent or about 8.77 square miles are occupied by streets and alleys. Only the land in use or useable is considered in the tabulation below.

Land Use

Use	Per Cent
"A" Residential	27.79
"B" Residential	4.70
Commercial	3.54
Light Industrial	3.68
Heavy Industrial	3.96
Public	13.49
Semi-Public	3.04
Utilities	11.17
Utility-owned, other use	.19
Unimproved	28.38
Unimproved, commercial use	.06
Total	100.00

Zoning

Use	Per Cent
"A" Residential	30.44
"B" Residential	17.68
Commercial	7.48
Light Industrial	12.72
Heavy Industrial	17.93
Public	11.30
Utility rights-of-way	2.45
Total	100.00

*Data obtained from MS records in the office of the Toledo and Lucas County Plan Commissions.

APPENDIX II

NOTES ON THE FIGURES

Figure 1. Distribution of the Primary Functions of Toledo, Ohio

Base Map: Made by the author and utilizing various maps of Toledo, Agricultural Adjustment Administration aerial photographs, and field investigation.

Data largely from field investigation.

Figure 2. Toledo's Position in the American Manufacturing Belt

Base Map: U. S. Geological Survey, Map of the United States. Scale 1:2,500,000.

Railroads are from: above reference.

Air routes are from: American Aviation Associates, Inc., The Air Traffic Guide.

Industrial Areas are from: Sixteenth Census of the United States: 1940. Manufactures, Vol. I, p. 49.

Manufacturing Belt is from: National Resources Planning Board, Industrial Location and National Resources, p. 12. The Ontario peninsula was added by the author.

Major metropolitan centers are the central cities of metropolitan districts having over 750,000 population.

Primary hinterland was taken as the area within approximately 200 rail or highway miles of Toledo.

Figure 3. Airview of the Central Business District-- Site of Toledo's Initial Development

Photograph reproduced through the courtesy of McLaughlin Air Service, New York.

Figure 4. Rate of Population Change for Eight East North Central Cities and Toledo's Growth in Population

Data from: Sixteenth Census of the United States: 1940. Population, Vol. I, passim.

Figure 5. Early Settlements in Relation to Toledo

Map is a revision of Plate I in Major Street Report, A Report by Harland Bartholomew, p. 10. Several changes and additions were made to this map.

Figure 6. Annexations to Toledo

Base Map: Lucas County Engineers Office, Road Map of Lucas County. Scale: ca. 1 inch to 5,500 feet.

Data from manuscript map in the office of the Division of Engineering and Construction, Toledo. Scale: 4 inches to 1 mile.

Figure 7. Toledo in 1888

Sketch of Toledo reproduced from Clark Waggoner, History of the City of Toledo and Lucas County, Ohio, facing p. 370.

Figure 8. Transportation Facilities: Toledo, Ohio

Base Map: Lucas County Engineers Offices, Road Map of Lucas County. Scale: ca. 1 inch to 5,500 feet.

Data from above base map, the Division Office of Ohio Department of Highways, and field investigation.

Figure 9. Abandoned Transportation Facilities

Base Map: U. S. Coast and Geodetic Survey, Sectional Aeronautical Charts, Lower K-16 and Lower K-17, 1932. Scale 1:500,000. These charts correspond to U-7 and U-8 of the present series. Old series used as most of the interurban lines were shown.

Data from: Central Electric Railfans' Association, Time Tables of Electric Railways, 1917. Bull. 59 (January, 1945) except Toledo and Indiana Railroad which is from Poor's Manual of Railroads, 1926.

Figure 10. Toledo's Rail Facilities in Relation to the Total Pattern of East North Central United States

Base Map and Source: Chief of Engineers, U. S. Army, Railroad Map of the United States, 1940. Scale 1:500,000.

Inset Map: Toledo's Railroad Facilities.

Base Map and Source: U. S. Coast and Geodetic Survey, Sectional Aeronautical Chart, U-8. Scale 1:500,000.

Figure 11. Toledo and the Flow of Railroad Freight Traffic

Adapted from charts in U. S. National Resources Planning Board, Transportation and National Policy, pp. 37-38.

Note on maps: No scale for the flow lines is available, but the relative densities are well shown. Flows between cities have been combined to prevent disclosure of traffic of individual railroads. The heavy flow of freight, predominantly coal, to Lake Erie ports necessitated the addition of chart B. The author has received no reply from the H. H. Copeland Company regarding the scale of the flow lines. The heavy volume of traffic on the routes shown in chart B suggests that the same scale applies to both charts.

Figure 12. Freight Train Movement

Base Map: U. S. Geological Survey, Sylvania, Toledo, Point Place, Maumee, Rossford, and Walbridge Quadrangles. Scale 1:31,680.

Source: Interviews with officials of the individual railroads. As the flows are based on daily scheduled trains and do not include extra sections, they are applicable at present as well as for the period indicated (1944).

Figure 13. Passenger Train Movement

Base Map: same as Fig. 12.

Source: Union Passenger Station Train Schedule, Time Table No. 57A and time tables of the Pennsylvania and Ann Arbor railroads.

Figure 14. Highway Traffic Flow, Toledo and Vicinity

Adapted from map in Toledo, Ohio: Regional Traffic Study, 1943, p. 46. The survey was made in 1942.

Inset Map: Ohio State Highway Department, Traffic Flow Map: State of Ohio, 1941. Scale: ca. 1:780,000.

Figure 15. Major Traffic of the Port of Toledo

Base Map: U. S. Army, Corps of Engineers, Port Facilities at Toledo, Ohio. Scale: ca. 1 inch to 1,100 feet. This map appears in The Port of Toledo, Ohio, Lake Series No. 7. Changes made to shore line are based on U. S. Lake Survey Office, Toledo Harbor, Ohio, 1943. Scale 1:20,000.

Data from field investigation.

Figure 16. Airview of Chesapeake and Ohio Coal and Ore Docks and Car Storage Yards

Photograph reproduced through the courtesy of Mr. Milton Zink, Toledo, Ohio.

Figure 17. Toledo in Relation to the Pipe Lines and Refineries of East North Central United States

Base Map: U. S. Geological Survey, Map of the United States. Scale 1:2,500,000.

Pipe Lines: The principal source was The Petroleum Publishing Co., Map of Crude Oil and Products Pipe Lines. Scale: ca. 1:4,350,000.

The above map is a supplement to The Oil and Gas Journal, September 24, 1942. Recent construction and dates were obtained largely from the "Annual Review" issue of the forementioned publication. Additional assistance from the Ohio Gas and Oil Association, The Buckeye Pipe Line Company, and the Michigan Public Service Commission.

Refineries: The Oil and Gas Journal, March 31, 1945, pp. 296 f.

Figure 18. Airview of Toledo's Commercial
Zone Looking Northeast

Photograph reproduced through the courtesy of Hamilton Wright Organization, Inc., New York. Picture taken by Fairchild Aerial Surveys, Inc. on June 2, 1945.

Figure 19. Central Business District: Toledo, Ohio

Base Map: Division of Engineering and Construction, Downtown Section. Scale: 1 inch to 100 feet.

Source: Field mapping completed in summer, 1946.

Cf. Ohio Bell Telephone Company, Toledo and Vicinity Telephone Directory, June, 1946. Downtown Toledo, p. 4 of Civic section. Map by author.

Figure 20. Wholesale-Terminal District: Toledo, Ohio

Base Map: Division of Engineering and Construction, Section 10 of city map. Scale: 1 inch to 200 feet.

Source: Field mapping completed in summer, 1946.

Figure 21. Toledo Service Areas

Base Map: Gulf Oil Corporation, Ohio: Info-Map. Scale: ca. 1:660,000.

Individual lines are taken from the following sources:

Metropolitan Area: U. S. Bureau of the Census

Metropolitan Area: Toledo Chamber of Commerce, Toledo Business, April, 1929, p. 7. Eight factors designated by the Bureau of the Census were used as a basis for this area.

Natural Area of Trade: National Recovery Administration, Natural Areas of Trade in the United States, 1935. Map of area 04-1.

Retail Trading Area: Hagstrom Company, Hagstrom's 4-Color Retail Trading Area Map of the United States. n.d.

Retail Trading Area: Audit Bureau of Circulations, 1943.

Wholesale Meats: Swift and Company (interview)

Wholesale Groceries: Lee and Cady (interview)

Wholesale Bakeries: generalization from the areas of Continental, Taystee, and General Baking Companies (interview)

Wholesale Drugs: Walding, Kinnan, and Marvin (interview)

Country Bank Territory: Toledo Trust Company (interview)

Milk Shed: Toledo Board of Health (interview)

Note on Cities and Towns: All cities over 20,000 persons are primary and secondary trading centers, and all towns having over 5,000 are principal sales centers for somewhat more restricted areas.

Figure 22. The Service Area of a Leading
Toledo Department Store

Base Map: U. S. Coast and Geodetic Survey, Sectional Aeronautical Chart, U-8. Scale 1:500,000.

Source: Survey by author in 1944 of out-of-town accounts of LaSalle & Koch. Accounts considered active were those used

within the past year. Diameters of circles are proportional to the square root of number of accounts.

Limit of major trade influence determined by author.

Figure 23. Toledo Manufacturing Establishments, 1946

Adapted from map in Toledo and Lucas County Plan Commissions, What About our Future?, p. 30.

Figure 24. Airview of the Principal Waterfront Industrial Area Along the Lower River East Shore looking Northeast

Photograph reproduced through the courtesy of Mr. Milton Zink, Toledo, Ohio.

Figure 25. Distribution of Automotive, Steel, and Machinery Industries in Northeastern United States

Adapted from maps in U. S. National Resources Committee, The Structure of the American Economy, pp. 40, 50, 52.

Central Automobile District: C. C. Colby and A. Foster, Economic Geography, p. 349.

American Manufacturing Belt: See Fig. 2.

Figure 26. Airviews of Toledo Petroleum Refineries

Photographs purchased from Charles A. Byers and Associates, Toledo, Ohio.

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